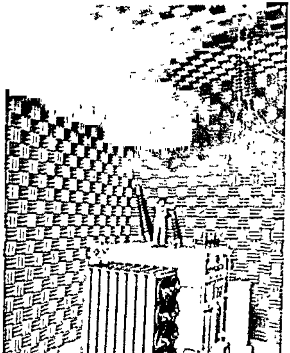
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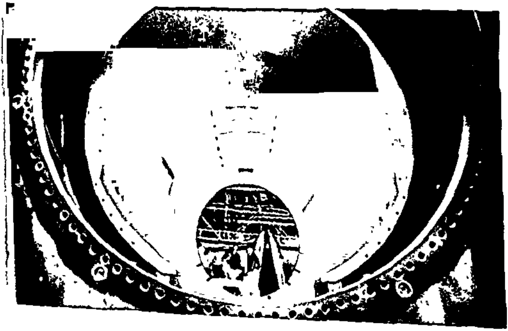


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(LEFT) Anechoic vault of 231,000 cubic feet for making sound measurements on large transformers (*Westinghouse*).(RIGHT) Housing for a 3600-rpm turbine generator (*Westinghouse*)

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Key to Names of Contributors

A key to the names of contributors, as indicated by initials following articles, and a list of contributors, their affiliations, and articles they wrote, will be found on following pages.

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A

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A.A.Z.	A. A. Zimmermann
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E A B	Edward A Boyden
E A E	E A Eckhardt
E A F	E A Freundt
E A G	Earl A Gulbransen

Key to Contributors

E.A.H.	E. A. Hollowell
E.A.HA.	Eugene A. Hausman
E.A.L.	Edmund A. Laport
E.A.S.	Edward A. Silver
E.A.ST.	Edward A. Steinhaus
E.A.W.	E. A. Wright
E.B.	Edward Brinton
E.BU.	Evers Burtner
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E.D.B.	Eugene D. Becken
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E.E.C.	Ernest E. Charlton
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J W W	James W Warwick
J W WE	John W Wells
J W WI	J Walter Wilson
J W WN	J W Wentworth

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Y C F	Yuan Cheng Fung

Z

Z K	Zdenek Kopal
Z S	Zdenek Sekera

Contributors

Their affiliations and titles of the articles they contributed
(For identification of the contributor initials shown at the end of each article see Key to Names of Contributors, page 1.)

A

Abbott, Dr Donald P. *Associate Professor of Biology, Hopkins Marine Station of Stanford University* ASCIDIACEA; LARVACEA, THALIACEA, TUNICATA

Abbott, Lester E. *Member Technical Staff, Bell Telephone Laboratories* BRAZING

Abrahams, Prof. Elihu *Physics Department, Rutgers University* FERROMAGNETISM (in part); PARAMAGNETISM (in part), other articles in magnetism (co-authored)

Abzug, Malcolm J *Supervisor of Aerodynamics, Stability, and Control, Douglas Aircraft Company, Inc* ELEVATOR, AIRCRAFT, FLIGHT CONTROLS, RUDDER, AIRCRAFT, STABILIZER

Ackerman, Dr Edward A *Executive Officer, Carnegie Institution of Washington* EARTH RESOURCE PATTERNS, LAKE, RIVER, SOIL CONSERVATION.

Adams, Dr Elijah *Professor and Director, Department of Pharmacology, St Louis University School of Medicine* POISON

Adams, Dr Joe Taylor *Research Department, Union Carbide Chemicals Company* ETHYLENE GLYCOL, GLYCOL; POLYETHYLENE GLYCOL, POLYHYDROXY ALCOHOL.

Adams, Dr Roger *University of Illinois* ORGANIC CHEMICAL SYNTHESIS

Adams, Dr W Robert *Assistant Professor, Department of Pathology, Yale University School of Medicine* EYE DISORDERS, SKELETAL SYSTEM DISORDERS, related articles in pathology

Adamson, Prof Arthur Wilson *Department of Chemistry, University of Southern California* TITANIUM

Adcock, Dr Willis A *Manager of Research and Engineering and Quality Assurance Departments, Semiconductor—Components Division, Texas Instruments, Inc* GERMANIUM

Addison, Dr. Cyril Clifford *Nottingham University, England.* NITROGEN OXIDES

Adelberg, Dr Edward A *Department of Bacteriology, University of California* AMINO ACIDS, TRANSAMINATION, articles on each naturally occurring amino acid

Ahlstrom, Dr Elbert H *Laboratory Director, U.S Bureau of Commercial Fisheries.* BDELLOIDEA, MONOGONONTA, ROTIFERA, SEISONACEA

Albert, Dr Henry John *Head of Physics Department, Research and Development Division, Engelhard Industries, Inc* PALLADIUM, RHODIUM, RUTHENIUM.

Albert, Dr Waco W *College of Agriculture, University of Illinois* CATTLE PRODUCTION, BEEF

Albright, Prof. Lyle F *Professor of Chemical Engineering, Purdue University* NITRATION (in part)

Albrink, Dr Wilhelm S *Associate Professor of Pathology, Yale University School of Medicine* INFLAMMATION

Alburger, Dr David E *Brookhaven National Laboratory.* ISOMERISM, NUCLEAR, MULTIPOLE RADIATION.

Alderfer, Dr. Russell Brunner. *Chairman, Soils Department, College of Agriculture, Rutgers University.* SOIL (in part).

Aldrich, Dr. Daniel Gaskill, Jr. *Dean of Agriculture, University of California* SOIL (in part).

Alexopoulos, Prof. Constantine John. *Department of Botany, University of Iowa.* FUNGI; MYXOMYCETES, articles on related taxonomic groups.

Alger, Prof. Philip Langdon *Adjunct Professor of Electrical Engineering, Rensselaer Polytechnic Institute* INSULATION, ELECTRIC

Alikonis, Justin J. *Director of Research, Paul F Beich Company* FOOD MANUFACTURING (in part).

Allan, Dean William. *School of Technology, City College of New York.* CHANNEL, OPEN; HYDRAULICS, HYDROMECHANICS, HYDROSTATICS

Allee, Paul A. *Physicist, Physical Science Laboratory, U S Weather Bureau* BROCKEN SPECTER.

Allen, Edward W., Jr. *Chief Engineer, Federal Communications Commission* BANDWIDTH REQUIREMENTS (COMMUNICATIONS), RADIO SPECTRUM ALLOCATIONS

Allen, Eleanor *Managing Editor, 'SAE Journal'* TURBINE PROPULSION

Allen, Prof Oscar N *Professor of Bacteriology, University of Wisconsin.* RHIZOBIACEAE.

Aller, Dr Lawrence H *Professor of Astronomy, University of Michigan.* ASTROPHYSICS, NEBULA, GASEOUS, other articles in astronomy.

Allfrey, Prof. Vincent G. *The Rockefeller Institute* NUCLEIC ACID; NUCLEOPROTEIN

Allport, H Burnham *National Carbon Company, Division of Union Carbide Chemicals Corp* ACTIVATED CARBON

Allsman, Paul T *Chief Mining Engineer, U.S. Bureau of Mines, Department of the Interior* MINING EXCAVATION

Altman, Dr. David *Vice-President and Director, Research Division, United Technology Corporation* BORON FUEL, METAL-BASE FUEL

Amberson, Dr William Ruthrauff *Biologist, Marine Biological Laboratory, Woods Hole, Massachusetts* PHYSIOLOGY, GENERAL

Ammons, Dr. Nelle *Department of Biology, West Virginia University.* FLOWER (BOTANY), FRUIT (BOTANY), ROOT (BOTANY)—all in part, other articles in botany

Amsden, Dr Thomas W *Geologist, Oklahoma Geological Survey* SILURIAN.

Anderson, Dr John R. *Assistant Director, Technical Service Laboratory, Union Carbide Chemicals Company* MOLECULAR WEIGHT

Anderson, Dr Wilhelm *Director, Foreign Agricultural Analysis Division, Foreign Agriculture Service, U.S Department of Agriculture* AGRICULTURE (in part)

Andrew, Dr Warren *Department of Anatomy, Indiana University* LYMPHATIC SYSTEM (in part)

Ankeney, D P *Aeronautical Research Engineer, U S Naval Ordnance Test Station* SCHLIEREN PHOTOGRAPHY

Ankeny, Marling J. *Director, Bureau of Mines, U.S Department of the Interior.* MINING SAFETY, SAFETY LAMP

Anscombe, Prof. Francis John *Department of Mathematics, Princeton University* QUEUEING THEORY

Antonides, Lloyd E. *'Engineering and Mining Journal'* MINING MACHINERY

Apker, Dr. L. *Physicist, General Electric Research Laboratory* PHOTOCONDUCTIVITY; PHOTOEMISSION; other articles in solid-state physics

Applegate, Charles E. *Sylvania's Electronic Systems, Division of Sylvania Electric Products, Inc* RESISTANCE MEASUREMENTS; other articles in electrical measurements

Archer, E. James. *Department of Psychology, University of Wisconsin.* PROBLEM SOLVING (PSYCHOLOGY).

Arey, Prof Leslie Brainerd *Professor emeritus of Anatomy, Northwestern University.* LIP; ORAL GLAND, PALATE; TONGUE.

Armstrong, Cole Alexander *Director of Military Communications Engineering, Bell Telephone Laboratories, Inc* SWITCHING SYSTEMS (COMMUNICATIONS).

Armstrong, Francis Adolf John. *Chemist, Marine Biological Association of the United Kingdom, Plymouth, England* SEA WATER FERTILITY (in part)

Arnett, Dr. Ross Harold, Jr *Department of Biology, The Catholic University of America.* COLEOPTERA

Arnold, Dr Chester Arthur *Professor of Botany and Geology and Curator of Paleobotany, University of Michigan* ARCHAEOPTERIS, CAYTONIALES, NEMATOPHYTALES, PLEUROMEIALES

Arnold, Prof James R. *Department of Chemistry, University of California.* RADIOACTIVE SPECIES PRODUCED BY COSMIC RAYS.

Arnstein, Dr Karl. *Vice-President (retired) in charge of engineering, Goodyear Aircraft Corporation* AEROSTAT; AIRSHIP, BALLOON, BLIMP, DIRIGIBLE—all in part

Aron, Prof Walter *Department of Physics, University of Virginia* ELECTRICITY

Artz, Dr Neal E *Corn Products Company.* INOSITOL (in part).

Ash, Col Simon H *Consulting Civil and Mining Engineer.* MINING OPERATING FACILITIES (in part)

Aston, Dr James *Consulting Metallurgist (retired), A. M. Byers Company* WROUGHT IRON.

Atkinson, Dr Robert D'Escourt *Chief Assistant, Royal Greenwich Observatory, Sussex, England.* CLOCK

Atoda, Dr Kenji *Professor of Zoology, Tohoku University, Japan* ANTHOZOA, articles on related taxonomic groups

Austin, Prof James Murdock *Associate Professor of Meteorology, Massachusetts Institute of Technology.* WEATHER (FORECASTING AND PREDICTION)—in part.

Averbach, Prof B. L. *Department of Metallurgy, Massachusetts Institute of Technology* HEAT-TREATMENT (METALS AND ALLOYS)—in part.

Ax, Dr Albert F *The Lafayette Clinic* EMOTION, LIE DETECTOR

Ayres, Eugene, *Author of technical books and articles* ENERGY SOURCES, other articles on sources of energy

Ayres, Prof Quincy Claude *Professor of Agricultural Engineering, Iowa State University* AGRICULTURE (DRAINAGE).

B

Babcock, Dr Horace W *Assistant Director, Mount Wilson and Palomar Observatories.* STELLAR MAGNETIC FIELD.

Backstrom, Prof Gunnar Bengt *Assistant Professor of Physics, University of Upsala, Sweden* BETA RAYS; GAMMA RAYS; PAIR PRODUCTION (ELECTRON-POSITRON).

Bader, Dr. Richard G *Professor of Oceanography and Meteorology, Agricultural and Mechanical College of Texas.* GULF OF MEXICO

Baer, Prof Charles John *Department of Engineering Graphics, University of Kansas* DRAFTING, PICTORIAL DRAWING (in part)

Alburger, Dr David E *Brookhaven National Laboratory* ISOMERISM, NUCLEAR; MULTIPOLE RADIATION.

Alderfer, Dr. Russell Brunner. *Chairman, Soils Department, College of Agriculture, Rutgers University.* SOIL (in part).

Aldrich, Dr. Daniel Gaskill, Jr. *Dean of Agriculture, University of California.* SOIL (in part)

Alexopoulos, Prof Constantine John *Department of Botany, University of Iowa* FUNGI; MYXOMYCETES, articles on related taxonomic groups.

Alger, Prof. Philip Langdon. *Adjunct Professor of Electrical Engineering, Rensselaer Polytechnic Institute* INSULATION, ELECTRIC.

Alikonis, Justin J. *Director of Research, Paul F Beich Company.* FOOD MANUFACTURING (in part)

Allan, Dean William. *School of Technology, City College of New York.* CHANNEL, OPEN, HYDRAULICS, HYDROMECHANICS, HYDROSTATICS

Allee, Paul A *Physicist, Physical Science Laboratory, U.S Weather Bureau* BROCKEN SPECTER

Allen, Edward W, Jr *Chief Engineer, Federal Communications Commission* BANDWIDTH REQUIREMENTS (COMMUNICATIONS), RADIO SPECTRUM ALLOCATIONS

Allen, Eleanor. *Managing Editor, 'SAE Journal'* TURBINE PROPULSION

Allen, Prof. Oscar N *Professor of Bacteriology, University of Wisconsin* RHIZOBIACEAE

Aller, Dr Lawrence H *Professor of Astronomy, University of Michigan* ASTROPHYSICS, NEBULA, GASEOUS, other articles in astronomy

Allfrey, Prof. Vincent G *The Rockefeller Institute* NUCLEIC ACID, NUCLEOPROTEIN

Allport, H Burnham *National Carbon Company, Division of Union Carbide Chemicals Corp* ACTIVATED CARBON

Allsman, Paul T *Chief Mining Engineer, U S Bureau of Mines, Department of the Interior* MINING EXCAVATION

Altman, Dr David *Vice-President and Director, Research Division, United Technology Corporation* BORON FUEL, METAL-BASE FUEL

Amberson, Dr William Ruthrauff *Biologist, Marine Biological Laboratory, Woods Hole, Massachusetts* PHYSIOLOGY, GENERAL

Ammons, Dr Nelle *Department of Biology, West Virginia University* FLOWER (BOTANY), FRUIT (BOTANY), ROOT (BOTANY)—all in part, other articles in botany

Amsden, Dr Thomas W *Geologist, Oklahoma Geological Survey* SILURIAN

Anderson, Dr John R *Assistant Director, Technical Service Laboratory, Union Carbide Chemicals Company* MOLECULAR WEIGHT

Anderson, Dr Wilhelm *Director, Foreign Agricultural Analysis Division, Foreign Agriculture Service, U.S Department of Agriculture* AGRICULTURE (in part)

Andrew, Dr Warren *Department of Anatomy, Indiana University* LYMPHATIC SYSTEM (in part).

Ankeney, D P. *Aeronautical Research Engineer, U.S Naval Ordnance Test Station* SCHLIEREN PHOTOGRAPHY

Ankeny, Marling J. *Director, Bureau of Mines, U.S Department of the Interior.* MINING SAFETY, SAFETY LAMP

Anscombe, Prof Francis John *Department of Mathematics, Princeton University* QUEUEING THEORY

Bartels, Prof Jerome *Professor of Mechanical Engineering, Polytechnic Institute of Brooklyn.* CARNOT CYCLE; REFRIGERATION CYCLE; THERMODYNAMIC CYCLE, other articles in mechanical POWER

Barth, Prof Tom F. W *Professor of Mineralogy, University of Oslo, Norway* METAMORPHIC ROCKS; METAMORPHISM; related articles in metamorphic petrology.

Barton, Dr Paul B, Jr *Geologist, U.S. Geological Survey.* ORE DEPOSITS, GEOCHEMISTRY OF (in part).

Basolo, Prof Fred. *Department of Chemistry, Northwestern University* COMPLEX COMPOUNDS, COORDINATION CHEMISTRY.

Batchelder, Howard R *Consulting Chemical Engineer, Battelle Memorial Institute* FUEL.

Bateman, Dr John Burraston *Deputy Scientific Attaché, American Embassy, London, England* CELL MEMBRANES AND MONOLAYERS

Bates, Dr Charles C *Environmental Systems Coordinator, Development Analysis Group, Office of the Chief of Naval Operations* DELTA (in part).

Battan, Prof Louis J *Professor of Meteorology and Associate Director, Institute of Atmospheric Physics, University of Arizona* LIGHTNING, THUNDER

Baumeister, Theodore Con[illegible]
Mechanical Engineering,
Marks' Mechanical Engine
ER PLANT, VALVE, VAPO
power

Baver, Dr Leonard D *Director, Experiment Station, Hawaiian Sugar Planters' Association* SORGHUM (in part), SUGAR BEET, SUGAR CANE (in part), SUGAR CROPS

Bayley, Dr Stanley Thomas *Division of Applied Biology, National Research Council of Canada* CELL WALLS IN PLANTS

Beachell, William A *Agricultural Marketing Service, Grain Division, U.S Department of Agriculture* PEA (in part)

Bear, Dean Richard S *College of Sciences and Humanities, Iowa State University* CYTOLOGY (MOLECULAR BASIS)

Beard, Robert Gordon *Instructor in Biology, Swarthmore College* HEMATOPOIESIS (in part)

Bearden, Prof J A *Johns Hopkins University* ATOMIC CONSTANTS (in part), X-UNIT

Beaumont, Dr Arthur Bishop *Professor emeritus of Agronomy, University of Massachusetts* BUCKWHEAT, RAPE, SUNFLOWER

Beaumont, Prof Ross A *Professor of Mathematics, University of Washington* DETERMINANT, EQUATIONS, THEORY OF, MATRIX THEORY, other articles in mathematics

Beaver, Wallace W *Director of Research and Development, Brush Beryllium Company* BERYLLIUM ALLOYS, BERYLLIUM METALLURGY

Bechtol, Dr Charles O *Division of Orthopedic Surgery, University of California Medical School* BONE (BIOPHYSICS), PROSTHESIS

Beck, Dr Charles B *Assistant Professor of Botany, University of Michigan* LEPIDODENDRALES

Becken, Eugene Duane *Vice-President, Operations Engineering, R C A Communications, Inc* TELEGRAPHY (in part)

Becker, Dr Donald Eugene *Department of Animal Science, University of Illinois* SWINE PRODUCTION.

Becker, Prof Elery R *Professor of Parasitology, Arizona State University* SPOROZOA, articles on related taxonomic groups

Beckhorn, Dr Edward John *Director of Research, Wallerstein Company* ENZYME (INDUSTRIAL PRODUCTION)

Baer, Dr Donald R. *Jackson Laboratory, Organic Chemicals Department E I. du Pont de Nemours and Company* ALICYCLIC HYDROCARBON.

Bagnall, Dr. Kenneth Winfield. *Research Chemist, United Kingdom Atomic Energy Authority.* POLONIUM.

Bailey, Dr Reeve M *Professor of Zoology, University of Michigan.* PISCES (ZOOLOGY); articles on related taxonomic groups

Bain, Prof. George W. *Amherst College, Department of Geology.* MINERAL RESOURCE AREAS.

Baird, Dr Donald. *Assistant Curator of Vertebrate Paleontology, Princeton University* MESOSAURIA

Baker, Dr. Edward W *Entomology Research Division, Agricultural Research Service, U S Department of Agriculture* TROMBIDIFORMES

Baker, Prof William Kaufman *Professor of Zoology, University of Chicago.* MUTATION

Baldwin, Prof William Marsh, Jr *Case Institute of Technology* PLASTIC DEFORMATION OF METAL.

Ball, Dr. C Olin. *Department of Food Science, Rutgers University.* FOOD ENGINEERING (in part).

Ballard, Prof William Whitney *Zoology Department, Dartmouth College* ESOPHAGUS, PHARYNX

Balsley, Dr James R *Chief, Geophysics Branch, U S Geological Survey* AEROMAGNETIC SURVEYING

Banks, Dr Harlan P *Professor of Botany, Cornell University* HYENIALES, PSEUDOBORNIALES

Barer, Dr Robert *University Demonstrator in Human Anatomy, Oxford University, England* MICROSCOPE, INTERFERENCE, MICROSCOPE, PHASE CONTRAST

Barghoorn, Prof Elso S *Department of Biology, Harvard University* CORDAITALES, NOEGGERATHIALES, PETRIFACTION

Barker, Prof H A *Department of Biochemistry, University of California* BACTERIAL METABOLISM (in part), PROPIONIBACTERIACEAE

Barker, Dr Joseph W *Chairman of the Board (retired), Research Corporation* ENGINEERING

Barksdale, Prof Lane *Department of Microbiology, New York University College of Medicine* DIPHTHERIA

Barnard, Dr J. Laurens *Director of Zoology, Beaunette Foundation* AMPHIPODA, GAMMARIDEA

Barnes, Dr Harold *Senior Principal Scientific Officer, The Scottish Marine Biological Association, Scotland* UNDERWATER TELEVISION

Barnes, Prof Ralph M *Professor of Engineering and Production Management, University of California at Los Angeles* INDUSTRIAL ENGINEERING

Barnett, Dr Roy N *Associate Clinical Professor of Pathology, Yale University School of Medicine* HERNIA, KIDNEY DISORDERS, REPRODUCTIVE SYSTEM DISORDERS, URINARY BLADDER DISORDERS

Barrington, Prof Ernest James William *Department of Zoology, The University, Nottingham, England* FEEDING MECHANISMS AND DIGESTION.

Barry, Dr. Alexander *Professor of Anatomy, Department of Anatomy, University of Michigan* CARDIOVASCULAR SYSTEM (in part)

Barstow, John MacDonald *Bell Telephone Laboratories, Inc* CLOSED-CIRCUIT TELEVISION

Beutner, Dr R. H. *College of Osteopathic Medicine and Surgery, Iowa* BIOELECTRIC MODEL

Bever, Dr Michael Berliner *Professor of Metallurgy, Massachusetts Institute of Technology* METALLOGRAPHY

Beverton, Raymond John Heaphy *Ministry of Agriculture, Fisheries and Food, England* SEA WATER FERTILITY (in part).

Bewley, Loyal V. *Dean of College of Engineering, Lehigh University* SYNCHRONOUS MOTOR; TRANSIENT, ELECTRIC; other articles on electric motors

Bicknell, Prof Joseph. *Associate Professor of Aeronautics and Astronautics, Massachusetts Institute of Technology* AERODYNAMIC FORCE

Biermann, David J *Vice-President, Hartzell Propeller, Inc* PROPELLER, AIR

Bigeleisen, Dr Jacob *Brookhaven National Laboratory.* DEUTERIUM

Bikales, Dr Norbert M *Research Chemist, American Cyanamid Company* CYANOETHYLATION

Billingham, Dr Rupert Everett *Professor of Zoology, University of Pennsylvania* INTEGUMENT (in part)

Billings, Dr Bruce Hadley *Baird-Atomic, Inc; Harvard College Observatory* CRYSTAL OPTICS, INTERFERENCE OF WAVES, POLARIZED LIGHT, other articles in physical optics

Billings, Dr W D *Professor of Botany, Duke University* ECOLOGY, PHYSIOLOGICAL

Billington, Dr Douglas Sheldon *Director, Solid State Division, Oak Ridge National Laboratory* RADIATION DAMAGE (INANIMATE MATERIALS)

Billmeyer, Dr Fred W, Jr *Polychemicals Department, E I du Pont de Nemours and Company, Inc* SCATTERING (ELECTROMAGNETIC RADIATION), ULTRAVIOLET RADIATION

Bing, Prof R H. *Department of Mathematics, University of Wisconsin* SET THEORY

Birkhoff, Garrett *Professor of Pure and Applied Mathematics, Harvard University* BOOLEAN ALGEBRA, LATTICE (MATHEMATICS)

Bishop, Dr David W *Research Professor of Embryology, Carnegie Institution of Washington* FERTILIZATION

Black, Dr Harold S *Member of Technical Staff, Bell Telephone Laboratories, Inc* AMPLITUDE MODULATION FREQUENCY MODULATION, PULSE MODULATION, other articles in communications

Black, Dr John D *Professor of Zoology, Missouri Teachers College* Series of articles in zoology

Black, Dr L M *Department of Botany, University of Illinois* PLANT VIRUS

Black, Prof Paul H *Department of Mechanical Engineering, Ohio University* MACHINE KEY, ROPE, TOLERANCE, other articles in machine design

Black, Prof Robert F *Department of Geology, University of Wisconsin* FROST ACTION, PERMAFROST

Blair, Dr John E *Head, Department of Bacteriology, Hospital for Joint Diseases, New York* GAFFKYA TETRAGENA, STAPHYLOCOCCUS

Blair, Dr W Frank *Professor of Zoology, University of Texas* COMMUNITY CLASSIFICATION

Blake, David K *Consultant, General Electric Company* ELECTRIC DISTRIBUTION SYSTEMS

Blanc, Milton L *Chief, Climatological Investigations Branch Office of Climatology, U.S Weather Bureau* AGRICULTURAL METEOROLOGY (in part), GROWING SEASON

Beerstecher, Prof Ernest, Jr *Professor of Biochemistry, School of Dentistry, University of Texas* PETROLEUM MICROBIOLOGY.

Beeson, Dr. Paul Bruce. *Professor of Medicine, Yale University.* CYSTITIS, ENDOCARDITIS, FEVER; other articles in medical science.

Beidler, Prof. Lloyd M. *Professor of Physiology, Florida State University* CHEMORECEPTION.

Beistline, Dean Earl Hoover. *Dean, School of Mines, University of Alaska.* MINING, PLACER

Belfort, Dr. Alan Michael. *Research chemist, American Viscose Corporation.* MANNAN (in part).

Bell, Kenneth E. *Vice-President and Technical Director (retired), A. C Lawrence Leather Company* LEATHER AND FUR PROCESSING

Bell, Prof W Charles *Professor of Geology, University of Texas* CAMBRIAN.

Bender, Prof Paul J *Professor of Chemistry, University of Wisconsin* ACTIVITY (THERMODYNAMICS), FREE ENERGY, THERMODYNAMICS (CHEMICAL), other articles in chemical thermodynamics

Benedetti-Pichler, Dr A A *Queens College* CHEMICAL MICROSCOPY, QUALITATIVE CHEMICAL ANALYSIS, SPOT-TEST ANALYSIS

Benedict, Dr Robert Glenn *In Charge, New Products and Reactions Exploration Investigations, Fermentation Laboratory* POLYMYXIN

Benfer, Neil A *Earth Sciences Editor, McGraw-Hill Encyclopedia of Science and Technology* INDEX FOSSIL, SEA STATE, SEA WATER (in part)

Benner, Dr Frank C *National Research Corporation* VACUUM FUSION

Bennett, Dr H Stanley *Department of Anatomy, University of Washington* CELL (BIOLOGICAL)—in part

Bennett, Dr Ralph E *Head Department of Microbial Biochemistry, Squibb Institute for Medical Research* PENICILLIN, TETRACYCLINE, other articles on antibiotics and on vitamins (coauthored)

Benton, Prof George Stock *Professor of Meteorology, Johns Hopkins University* HYDROMETEOROLOGY

Beranek, Dr Leo Leroy *President, Bolt, Beranek and Newman, Inc* SOUND, WAVE MOTION

Berg, Dr Clyde *Manager, Design Division, Union Oil Company of California* SOLIDS PUMP

Berger, Dr France B *Director of Planning and Requirements, GPL Division, General Precision, Inc* DOPPLER RADAR

Bergeron, Prof Tor *Meteorologiska Institutionen, Sweden* METEOROLOGY (in part)

Bergmann, Prof Peter G *Professor of Physics, Syracuse University* CLOCK PARADOX, FOURTH DIMENSION, RELATIVITY SPACE-TIME

Bernhardt, Carl Peter *Executive Assistant, Industrial Electronics Department, Westinghouse Electric Corporation* DIELECTRIC HEATING, INDUCTION HEATING

Bernheimer, Dr Allen W. *New York University* LEUKOCIDIN

Bernstein, Dr Robert Isaac. *Associate Director, Electronics Research Laboratories, Columbia University* RADAR, MOVING-TARGET INDICATION, other articles on radar

Berson, Prof Jerome A *Professor of Chemistry, University of Southern California* ORGANIC REACTION MECHANISM

Bethe, Prof. Hans Albrecht *Laboratory of Nuclear Studies, Cornell University* MATHEMATICAL PHYSICS; THEORETICAL PHYSICS

Boswell, Dr Victor R *Horticulturist, U.S. Department of Agriculture* MELON GROWING; articles on various melons

Botset, Prof Holbrook G *Professor of Petroleum Engineering, University of Pittsburgh* PHOTOCLINOMETER

Bouton, George M *Bell Telephone Laboratories, Inc.* SOLDERING

Bovell, Carlton Rowland *Assistant Professor of Life Sciences, University of California, Riverside* METHANOMONADACEAE (in part).

Bowden, W C. *Vice-President* (retired), *Ledoux and Company.* ASSAYING (in part).

Bower, Frank H *Engineering coordinator, Sylvania Semiconductor Division* THERMISTOR

Bowles, Oliver *Consultant in Mining Engineering.* QUARRYING; STONE AND STONE PRODUCTS

Bowman, Dean Harry Lake *Drexel Institute of Technology.* STRUCTURAL ANALYSIS, STRUCTURAL DEFLECTION, TRUSS.

Bowman, Rush A *Consulting Engineer* COMPARATOR, GAGES, OPTICAL FLAT.

Bowman, Richard George *Technical Assistant to the President, Republic Aviation Corporation* AIRCRAFT; STREAMLINING; TAIL ASSEMBLY.

Bowman, Dr Thomas E *Associate Curator, Division of Marine Invertebrates, Smithsonian Institution* FLABELLIFERA; HYPERIIDEA, PERACARIDA

Boyden, Prof Edward Allen *Department of Anatomy, University of Washington School of Medicine* GALLBLADDER

Bozorth, Dr Richard Milton *Research Physicist, Bell Telephone Laboratories, Inc* FERRITE, MAGNETIC MATERIALS, other articles on magnetic materials

Bradley, Charles Byron *Johns Manville Research Center* INSULATION, HEAT

Bradley, Dr William Frank *Chemist, Illinois Geological Survey* ASBESTOS, SEPIOLITE, SERPENTINE

Bradner, Mead *Manager, Research and Development, The Foxboro Company.* FLOW MEASUREMENT (in part)

Bradsher, Dr Charles Kilgo *Professor of Chemistry, Duke University* AROMATIC HYDROCARBON, BENZENE, FRIEDEL-CRAFTS REACTION, other articles on aromatic hydrocarbons

Brand, Dr Louis M D. *Anderson Professor of Mathematics, University of Houston* BARYCENTRIC CALCULUS, MATRIX CALCULUS, PROGRESSION (MATHEMATICS), other articles in mathematics

Branson, Dr Carl C *School of Geology and Oklahoma Geological Survey, University of Oklahoma* BLACK SHALE, REDBED

Brattstrom, Dr Bayard H *Assistant Professor of Biology, Orange County State College, California* LEPIDOSAURIA

Braun, Dr Werner *Professor of Bacteriology, Institute of Microbiology, Rutgers University* BACTERIAL GENETICS

Bredig, Dr Max A *Associate Director, Chemistry Division, Oak Ridge National Laboratory* FUSED-SALT PHASE EQUILIBRIA (in part)

Breger, Dr Irving Arthur *U.S Geological Survey* ASPHALT AND ASPHALTITE (in part), GILSONITE, OIL SHALE, other articles in petroleum geology

Breit, Prof Gregory *Professor of Physics, Yale University* SCATTERING EXPERIMENTS, NUCLEAR

Bretz, Prof J Harlen *Department of Geology, University of Chicago* CAVE; KARST TOPOGRAPHY.

Bricker, Prof. Clark E *Department of Chemistry, Princeton University* TITRATION, VOLUMETRIC ANALYSIS; other articles on volumetric analysis

Blankenship, Dr. Forrest F. *Reactor Chemistry Division, Oak Ridge National Laboratory.* FUSED-SALT PHASE EQUILIBRIA (in part).

Blaser, H Weston. *Associate Professor of Botany, University of Washington* BARK; PERIDERM; PITH.

Blatt, Dr. Frank J. *Associate Professor of Physics, Michigan State University* BOLTZMANN TRANSPORT EQUATION; FREE-ELECTRON THEORY OF METALS; HALL EFFECT, other articles in solid-state physics.

Blew, J. Oscar, Jr *Head of Section on Preservative Treatment, U.S. Forest Products Laboratory.* WOOD PRESERVATION

Blizard, Everitt P *Director, Neutron Physics Division, Oak Ridge National Laboratory* RADIATION SHIELDING

Blum, Dr William *National Bureau of Standards (retired)* ELECTROPLATING OF METALS

Blumenstock, Dr. David L *Climatologist, U S Weather Bureau,* CLIMATIC PREDICTION, CLIMATOLOGY

Blumenthal, Prof. Leonard M. *Professor of Mathematics, University of Missouri* ANALYTIC GEOMETRY, LOGIC; PROJECTIVE GEOMETRY; other articles in geometry

Boardman, Dr. Horace P *Professor emeritus of Civil Engineering, University of Nevada* SNOW GAGE, SNOW SURVEYING

Boast, Dr Warren B *Head, Department of Electrical Engineering, Iowa State University.* ILLUMINATION, LIGHT AMPLIFIER; LIGHT PANEL, LUMINAIRE

Bocciarelli, Carlo V *Associate Director of Research, Philco Corporation* PARAMETRIC AMPLIFIER

Bochner, Dr Salomon. *Henry Burchard Fine Professor of Mathematics, Princeton University* MATHEMATICS

Boden, Dr Brian Peter *Assistant Research Biologist, Scripps Institution of Oceanography, University of California* EUPHAUSIACEA

Bodian, Dr David *Professor and Director, Department of Anatomy, Johns Hopkins University School of Medicine* NERVOUS SYSTEM (in part).

Boell, Prof Edgar John *Department of Zoology, Yale University* ANIMAL GROWTH

Bohonos, Dr Nestor *Lederle Laboratories Division, American Cyanamid Company* CHLORTETRACYCLINE

Boisvert, Dr Paul L *Research Associate, Director of Disease Laboratory, Yale School of Medicine, Attending Pediatrician, Grace–New Haven Community Hospital* LANCEFIELD DIFFERENTIATION SCHEME, RHEUMATIC FEVER, STREPTOCOCCUS, other articles in medical science

Boke, Dr Norman H *Professor of Plant Sciences, University of Oklahoma.* EPIDERMIS, PLANT, MERISTEM, APICAL, SCLERENCHYMA

Bolz, Dr Ray E *Head of Mechanical Engineering Department, Case Institute of Technology* NUTATION (ASTRONOMY AND MECHANICS), POINSOT'S METHOD, PRECESSION, RIGID-BODY DYNAMICS

Bondurant, Donald C *U S Army Engineers Division, Missouri River (Sediment Investigations Section).* REVETMENT (in part)

Booker, Dr Henry G *School of Electrical Engineering, Cornell University* IONOSPHERE

Borcherdt, E R. *Borcherdt & Smith Mining Consultants* MINING, UNDERGROUND.

Borthwick, Dr. Harry Alfred *Crops Research Division, U.S Department of Agriculture.* PHOTOPERIODISM IN PLANTS

Boston, Orlan William *Professor emeritus, College of Engineering, University of Michigan* MACHINABILITY (METALS)

Brown, Lawrence C. *Contract Administrator, Grumman Aircraft Engineering Corporation* BALLISTIC MISSILE; GUIDED MISSILE

Brownell, Dr Go[illegible] *...eral Hospital.* ...NIQUES; RADIO...

Broyer, Theodore Clarence *Vice-Chairman of Department of Soils and Plant Nutrition, University of California* FERTILIZING (in part), HYDROPONICS, PLANT, MINERAL NUTRITION OF; PLANT, MINERALS ESSENTIAL TO

Bruhn, Prof Hjalmar D *Agricultural Engineering Department, University of Wisconsin.* AGRICULTURAL SOIL AND CROP PRACTICES (in part)

Bruner, Prof Jerome Seymour *Professor of Psychology, Harvard University* ABNORMAL BEHAVIOR, FREUDIANISM PERSONALITY THEORY, other articles on neuroses (all co-authored).

Bryan, Prof Leslie Aulls *Director, Institute of Aviation; Professor of Management, University of Illinois* AIR TRANSPORTATION, AVIATION

Bryson, Prof Arthur Earl, Jr *Harvard University* EULER'S MOMENTUM THEOREM, FLUID-FLOW PRINCIPLES; KARMAN VORTEX STREET, other articles in fluid mechanics

Buchwald, Dr Niels Fabritius *Professor in Plant Pathology, The Royal Veterinary and Agricultural College, Copenhagen, Denmark* FUNGI IMPERFECTI, articles on related taxonomic groups

Buck, Dr Dudley A *Department of Electrical Engineering, Massachusetts Institute of Technology* CRYOTRON

Buckley, Donald J. *Senior Research Associate, Esso Research and Engineering Company* COHESION (PHYSICS)—in part

Budlong, A L *Secretary and General Manager, American Radio Relay League, Inc* AMATEUR RADIO

Buechner, Prof William Weber *Professor of Physics, Massachusetts Institute of Technology* BARN (UNIT), NUCLEAR RADIATION, NUCLEAR REACTION, SPALLATION REACTION

Buettner, Dr Konrad J K *Department of Meteorology and Climatology, University of Washington* BIOCLIMATOLOGY

Bullen, Prof Keith Edward *Professor of Applied Mathematics, University of Sydney, Australia* EARTH INTERIOR

Bullington, Kenneth *Transmission Systems Engineer, Bell Telephone Laboratories, Inc.* RADIO-WAVE PROPAGATION

Bullock, Prof Theodore H *Department of Zoology, University of California* HEART (GANGLIONIC PACEMAKER), HEMICHORDATE, articles on related taxonomic groups

Bunker, Brig General William B *United States Army* HELICOPTER

Bunnett, Dr Joseph F *Professor of Chemistry, Brown University* SUBSTITUTION REACTION, other articles on organic reaction mechanisms

Burbidge, Dr E. Margaret *Associate Professor, Yerkes Observatory, University of Chicago* ELEMENTS AND NUCLIDES (ORIGIN)

Burchard, Kenneth R *Assistant Dean, School of Printing Management, Carnegie Institute of Technology.* PRINTING IN COLOR

Burrows, Prof William *Professor of Microbiology, University of Chicago* CHOLERA VIBRIO

Burtner, Prof Evers *Associate Professor (emeritus) of Naval Architecture and Marine Engineering, Massachusetts Institute of Technology* MARINE ENGINE

Burton, Dr Milton *Professor of Chemistry, Director, Radiation Project, University of Notre Dame* RADIATION CHEMISTRY

Burton, Dr Ralph A *Manager, Tribomechanics Section, Southwest Research Institute* ICE POINT, TEMPERATURE, THERMAL EXPANSION

Brickley, Robert L *Manager, Quality Assurance Department, Semiconductor Department, Westinghouse Electric Corporation.* ANALYSIS OF VARIANCE.

Bridgman, Prof. Percy Williams *Harvard University (retired)* HIGH-PRESSURE PHYSICS, SCIENCE; SCIENTIFIC METHODS; other articles on logic

Brigham, Harry Straight. *Executive Vice-President, Divilyn Drilling Corporation* OIL AND GAS WELLS (in part).

Bright, Prof. James Rieser *Graduate School of Business Administration, Harvard University.* AUTOMATION

Brimm, Dr Eugene O *Assistant Manager, Research Linde Company, Division of Union Carbide Corporation.* METAL CARBONYL

Brindley, Dr. George W *Professor of Solid State Technology in and Head of Department of Ceramic Technology, Pennsylvania State University* APOPHYLLITE, TALC

Brinton, Dr. Edward *Scripps Institution of Oceanography* SEA WATER FERTILITY (in part)

Brockway, Prof. Lawrence O *Chemistry Department, University of Michigan* ELECTRON DIFFRACTION (in part)

Brodersen, Prof Dr Klaus *Professor of Inorganic and Analytical Chemistry, University of Tubingen, Germany* MERCURY (ELEMENT).

Brodhag, Dr Alex Edgar, Jr *Research Chemist, Union Carbide Chemicals Company* FURFURAL, SCHIFF BASE

Brodsky, Prof William A *Professor of Experimental Medicine, University of Louisville School of Medicine* OSMOREGULATORY MECHANISMS

Broecker, Prof Wallace S *Department of Geology, Columbia University* LOW-LEVEL COUNTING, RADIOCARBON DATING

Brombacher, Dr William George *Mechanical Engineer, National Bureau of Standards* ACCELERATION MEASUREMENT, AIRCRAFT INSTRUMENTATION, TIME-INTERVAL MEASUREMENT, other instrumentation articles

Bronfenbrenner, Urie *Professor of Child Development and Family Relationships, Cornell University* INTELLIGENCE

Brooke, Dr M M *Chief, Microbiology Section, Communicable Disease Center, U S Public Health Service, Associate Professor of Parasitology, Emory University College of Medicine* PROTOMASTIGIDA, TRYPANOSOMATIDAE

Brooks, Dr Reid M *Professor, Department of Pomology, University of California* FRUIT (BOTANY)—in part

Brooks, Stanley Nelson *Research Agronomist, Crops Research Division, Agricultural Research Service, U S Department of Agriculture* HOP

Brouwer, Prof Dirk *Director, Observatory, Yale University* ANTIGRAVITY, GRAVITATION, GRAVITY

Brower, Prof William B, Jr *Department of Aeronautical Engineering Rensselaer Polytechnic Institute* ELECTROLYTIC TANK

Brown, Prof Frank Arthur, Jr *Morrison Professor of Biology, Northwestern University* PERIODICITY IN ORGANISMS, SIPUNCULOIDEA

Brown, Prof Frederick C *Department of Physics, University of Illinois* COLOR CENTERS, PHOTOLYSIS (PHOTOCHEMISTRY)

Brown, Dr Harold *Director, Lawrence Radiation Laboratory, Livermore, California* NUCLEAR EXPLOSION

Brown, Prof Harold W *College of Physicians and Surgeons, Columbia University* STRONGYLOIDEA

Brown, Dr Henry. *Research Director, Udylite Research Corporation* CADMIUM

Carson, Robert William *Product Engineering* CLADDING, METAL INSPECTION, MAGNETIC.

Carter, Archie Newton *President, Carter, Krueger, and Associates, Inc* TRANSPORTATION ENGINEERING; TRAFFIC ENGINEERING, PAVEMENT; HIGHWAY ENGINEERING

Carter, Dr George S *Fellow of Corpus Christi College; Lecturer in Zoology, Cambridge University, England* MACROEVOLUTION

Carter, Prof Herbert E *Department of Chemistry and Chemical Engineering, University of Illinois* CETYL ALCOHOL; GLYCOLIPID; LIPID—all in part, other articles on lipids (co-authored).

Caspari, Dr Ernest W. *Department of Biology, University of Rochester.* MATERNAL INFLUENCE, CYTOPLASMIC INHERITANCE

Caspers, Prof Dr Hubert *Head, Hydrobiological Department, Zoologisches Staatsinstitut, Germany* BLACK SEA.

Cave, Dr Genille C B *Department of Chemistry, McGill University, Canada* FORENSIC CHEMISTRY

Chace, Dr Fenner Albert, Jr *Curator, Division of Marine Invertebrates, Smithsonian Institution* DECAPODA (CRUSTACEA)

Chamberlain, Dr Joseph W *Associate Professor, Yerkes Observatory, University of Chicago* AURORA.

Chandler, Richard F *Mechanical Engineer, Air Force Missile Development Center, Holloman Air Force Base, New Mexico* SHADOWGRAPH OF FLUID FLOW

Chaney, Dr Ralph W *Department of Paleontology, University of California* PALEOBOTANY (in part).

Chang, Prof M C *Department of Biology, Boston University* REPRODUCTIVE SYSTEM (in part)

Chao, Dr Edward C T *U S Geological Survey* GYPSUM, other articles on sulfate and related minerals

Chapman, Prof Carleton A *Professor of Geology, University of Illinois* IGNEOUS ROCKS, MAGMA, PETROGRAPHIC PROVINCE, series of articles in igneous petrology

Chapman, Dr Sydney *Advisory Scientific Director, Geophysical Institute, University of Alaska, Member of Research Staff, High Altitude Observatory, Boulder, Colorado* GEOMAGNETIC STORM, GEOMAGNETIC VARIATIONS, TRANSIENT, GEOMAGNETISM

Charlton, Dr Ernest E *Research Engineer (retired)* X-RAY TUBE

Charney, Prof Jule G *Department of Meteorology, Massachusetts Institute of Technology* WEATHER (FORECASTING AND PREDICTION)—in part

Chase, Prof Herman Burleigh *Biology Department, Brown University* HAIR

Cheadle, Prof Vernon Irvin *Professor of Botany, University of California* MERISTEM, LATERAL, PERICYCLE, PHLOEM, XYLEM

Cheetham, Dr Alan H *Instructor in Geology, Louisiana State University* CENOZOIC, articles on related divisions of geologic time (co-authored)

Chellis, Robert Dunning *Structural Engineer, Stone and Webster Engineering Corporation* CAISSON FOUNDATION, FOUNDATIONS, PILE FOUNDATIONS, related articles in civil engineering

Chen, Dr Shih-Yuan *Chief, Aerothermodynamics Unit, Aero-Space Division, Boeing Airplane Company* THERMAL STRESS, AEROTHERMODYNAMICS, HYPERSONIC FLIGHT

Chenault, Roy Lee *Chief Research Engineer, Oil Well Supply Division, U S Steel Corporation* OIL AND GAS FIELD EXPLOITATION,

Chernow, Dr Marvin A *Clinical Instructor, Pathology, Yale School of Medicine, Associate Pathologist, Norwalk Hospital* HEART DISORDERS

Chew, Frank *Research Assistant Professor, The Marine Laboratory, University of Miami* GULF OF MEXICO [illegible]

Burwell, Prof. Robert L, Jr. *Professor of Chemistry, Northwestern University* CATALYSIS.

Busch, Prof. Daryle H *Department of Chemistry, Ohio State University* CHEMICAL STRUCTURES; NONSTOICHIOMETRIC COMPOUNDS, SOLID-STATE CHEMISTRY

Butler, Prof. Elmer Grimshaw *Henry Fairfield Osborn Professor of Biology, Princeton University.* REGENERATION (BIOLOGY).

Butts, Prof. Allison *Professor emeritus of Metallurgy, Lehigh University.* COPPER

Butz, J S, Jr. *'Aviation Week.'* FUSELAGE

Byerly, Prof. Perry *Director of Seismographic Stations, Professor of Seismology, University of California.* EARTHQUAKE

C

Cable, Prof Raymond Millard *Professor of Zoology, Department of Biological Sciences, Purdue University.* CERCARIA, DIGENEA

Cady, Dr Gilbert Haven *Head emeritus of Coal Division, Illinois State Geological Survey* COAL, LIGNITE, PEAT.

Cain, Prof Stanley A *Charles Lathrop Pack Professor of Conservation and Chairman of Conservation Department, University of Michigan.* CLIMAX PLANT FORMATIONS, CONSERVATION OF RESOURCES

Caley, Prof Earle Radcliffe *Department of Chemistry, Ohio State University* CHEMICAL DATING, ARCHEOLOGICAL CHEMISTRY

Calhoun, Dr John C, Jr *Vice-Chancellor for Engineering, Texas A & M College System* OIL AND GAS STORAGE, PETROLEUM SECONDARY RECOVERY

Callaway, Dr Joseph *Division of Physical Science, University of California* BAND THEORY OF SOLIDS, BRILLOUIN ZONE, COHESION (PHYSICS)—in part, other articles on band structure in solids

Cambel, Dr Ali Bulent *Professor and Chairman of Mechanical Engineering, Northwestern University* GAS DYNAMICS

Cameron, Donald B *Manager, Sales Engineering, Union Carbide Consumer Products Company* SOLION

Camilli, Guglielmo C *Supervisor, Advance Development Engineering, General Electric Company* INDUCTION COIL

Camin, Dr Joseph H *Department of Zoology, University of Maryland* MESOSTIGMATA, ONYCHOPALPIDA

Cammack, R L *Manager, Plant Services Department, Westinghouse Corporation* JIG, FIXTURE, AND DIE DESIGN

Camp, Prof Charles Lewis *Department of Paleontology, University of California* ICHTHYOPTERYGIA, ICHTHYOSAURIA

Cannon, Prof Robert Hamilton, Jr *Departments of Aeronautical and Electrical Engineering, Stanford University* AUTOPILOT, GYROSCOPE, articles on navigation instruments and guidance systems.

Carew, Dr John *Professor of Horticulture, Michigan State University* VEGETABLE GROWING, series of articles on edible plants

Carlin, Dr Robert B *Becker Professor of Organic Chemistry, Carnegie Institute of Technology* PHENOL, other articles on phenols

Carpenter, Dr Charles M *University of California School of Medicine* GONORRHEA, GRAM-NEGATIVE DIPLOCOCCI, MENINGOCOCCUS

Carpenter, Prof Frank Morton *Department of Biology, Harvard University* INSECTA FOSSILS

Carritt, Dr. Dayton Ernest *Massachusetts Institute of Technology and Woods Hole Oceanographic Institution* SEA WATER (in part)

Carroll, Phil *Consulting Industrial Engineer* WAGE INCENTIVES

Clausen, Dr Harry J *Research Fellowship Review Branch, Division of Research Grants, National Institutes of Health* PINEAL BODY.

Claussen, Dr Gerard E *Arcrods Company, Sparrows Point, Maryland* WELDING AND CUTTING OF METALS

Clayton, James Monroe *Electrical Engineer, Westinghouse Electric Corporation* ELECTRIC PROTECTIVE DEVICES; GROUNDING, ELECTRICAL

Clayton, Dr Richard K *Senior Biophysicist, Oak Ridge National Laboratory* BACTERIAL MOTILITY.

Clemence, Dr Gerald M *Scientific Director, U S Naval Observatory* ASTRONOMICAL COORDINATE SYSTEMS; CALENDAR, TIME, other articles on astronomy

Clemens, William A *Research Assistant, Department of Paleontology, University of California* PANTOTHERIA, other articles on fossil mammals

Clement, Prof Anthony C *Department of Biology, Emory University* CELL LINEAGE.

Clements, Dr Leo P *Creighton University School of Medicine* RESPIRATORY SYSTEM (in part)

Clements, Dr Thomas *Head, Department of Geology, University of Southern California* DESERT EROSION FEATURES, DUNE (in part), PLAYA

Clench, Dr William James *Curator of Mollusks, Museum of Comparative Zoology, Harvard University.* MOLLUSCA, articles on related taxonomic groups

Cleveland, Prof Laurence Fuller *Associate Professor of Electrical Engineering, Northeastern University.* DIRECT-CURRENT MOTOR, DYNAMIC BRAKING

Cloud, Dr. Preston E, Jr *U S Geological Survey* CORAL REEF, REEF, other articles on types of reef

Cobban, Dr William Aubrey *Geologist, U.S Geological Survey* CRETACEOUS, MESOZOIC

Cobine, Dr James Dillon *General Electric Research Laboratory.* GAS TUBE, THYRATRON, VOLTAGE-REGULATOR TUBE

Cochran, David *General Electric Company* JET PROPULSION, PROPULSION

Cochrane, Prof John D *Assistant Professor, Department of Oceanography, Texas A & M College* SEA WATER (in part).

Code, Prof Charles Frederick *Mayo Foundation and Mayo Clinic* DIGESTIVE SYSTEM (in part)

Coggeshall, Dr Ivan S *Manager, Technical Operations Services, American Institute of Electrical Engineers* TELEGRAPHY (in part)

Cohart, Prof Edward Maurice *Department of Public Health, Yale University School of Medicine* PUBLIC HEALTH

Cohen, Charles A *Research Associate, Esso Research and Engineering Company* ADDITION REACTION, DIENE, UNSATURATED HYDROCARBONS, other articles on unsaturated hydrocarbons

Cole, Prof LaMont C *Department of Zoology, Cornell University* POPULATION DYNAMICS

Cole, Marc *Senior Chemist, Production and Development, Hoffmann-LaRoche, Inc* VITAMIN B_6 (in part).

Cole, Dr W Storrs *Professor of Geology and Chairman of Department, Cornell University* NUMMULITES

Coleal, Ernest *Chief, Engineering Section, Experimental Track Branch, Air Force Flight Test Center, Edwards Air Force Base, California* ROCKET-SLED TESTING

Coleman, Dr Donald G *Chief, Research Publications and Information, Forest Products Laboratory, U.S Department of Agriculture* WOOD FIBER PRODUCTS

Chickering, Dr. Arthur Merton *Professor emeritus, Albion College.* ARANEAE

Childberg, Guy Lewis *Outside Plant Engineer, American Telephone and Telegraph Company* TELEPHONE SYSTEMS CONSTRUCTION.

Chilton, Dr St. John P. *Department of Botany, Louisiana State University.* SUGAR CANE, RICE (both in part)

Chitwood, Dr. Benjamin Goodwin. *Laboratory of Comparative Biology, Kaiser Foundation Research Institute* NEMATODA.

Chow, Dr. Kao Liang. *Department of Physiology, University of Chicago.* SENSORY LEARNING

Christ, Dr C. L *Physicist, U S. Geological Survey.* BORACITE, BORATE MINERALS

Christensen, Dr. Clyde M *Professor of Plant Pathology, University of Minnesota* PLANT DISEASE (in part).

Christensen, Dr J J *Institute of Agriculture, University of Minnesota* BARLEY, CORN, FLAX, WHEAT—all in part

Chute, Challoner Richard *General Aniline and Film Corporation, Central Research Laboratory* FIBER, NATURAL, TEXTILE CHEMISTRY

Clapp, Prof Leallyn B *Chemistry Department, Brown University* AMINE, OXIME, other articles on organonitrogen compounds

Clapp, Philip Fanshawe *U S Department of Commerce, Weather Bureau* WEATHER, WEATHER MAP

Clark, Prof George L *Research Professor of Analytical Chemistry, University of Illinois* X-RAY(S), PHYSICAL NATURE OF, X-RAY OPTICS

Clark, Dr Kenneth G *Fertilizer Investigations Research Branch, Soil and Water Conservation Research Division, Agricultural Research Service, U S Department of Agriculture* FERTILIZER

Clark, Dr Sam Lillard *Professor of Anatomy and Head of Department, Vanderbilt University Medical School* NERVOUS SYSTEM (in part)

Clark, Sydney P, Jr *Geophysicist, Carnegie Institution of Washington* EARTH (HEAT FLOW)

Clark, Pearl F (Mrs Wallace) *Honorary Director, Wallace Clark Center of International Management, New York University* GANTT CHART

Clark, Dr Walter *Head, Applied Photography Division, Research Laboratories, Eastman Kodak Company* CAMERA, PHOTOGRAPHY, PHOTOGRAPHY, COLOR, other articles on photography

Clark, William Petzold *Wall Colmonoy Corporation* METAL COATINGS *(in part)*

Clarke, Ellen *Columbia Organic Chemical Company* HALOFORM REACTION, HALOGENATED HYDROCARBON (in part)

Clarke, Dr George Leonard *Associate Professor of Zoology, Harvard University, and Marine Biologist, Woods Hole Oceanographic Institution* MICRORADIOGRAPHY (in part), RADIOGRAPHY, SEA WATER (in part)

Clarke, Dr J Harold *Horticulturist, Clarke Nursery Long Beach, Washington* FRUIT GROWING (SMALL) series of articles on fruits

Clarke, John H *Engineering Design Supervisor Air Conditioning and Power, Visking Company, Division of Union Carbide Corporation* VENTILATION

Clarridge, Ralph Ernest *Manager, Measurements Laboratory, General Electric Company* LEVEL MEASUREMENT TEMPERATURE MEASUREMENT, WEIGHT MEASUREMENT, articles on various measuring instruments

Clausen, Dr Harry J *Research Fellowship Review Branch, Division of Research Grants, National Institutes of Health* PINEAL BODY

Claussen, Dr Gerard E. *Arcrods Company, Sparrows Point, Maryland* WELDING AND CUTTING OF METALS

Clayton, James Monroe *Electrical Engineer, Westinghouse Electric Corporation* ELECTRIC PROTECTIVE DEVICES; GROUNDING, ELECTRICAL

Clayton, Dr Richard K *Senior Biophysicist, Oak Ridge National Laboratory* BACTERIAL MOTILITY

Clemence, Dr Gerald M *Scientific Director, U.S. Naval Observatory* ASTRONOMICAL COORDINATE SYSTEMS, CALENDAR; TIME; other articles on astronomy.

Clemens, William A *Research Assistant, Department of Paleontology, University of California* PANTOTHERIA; other articles on fossil mammals

Clement, Prof Anthony C. *Department of Biology, Emory University* CELL LINEAGE.

Clements, Dr Leo P *Creighton University School of Medicine* RESPIRATORY SYSTEM (in part)

Clements, Dr Thomas *Head, Department of Geology, University of Southern California* DESERT EROSION FEATURES, DUNE (in part), PLAYA

Clench, Dr William James *Curator of Mollusks, Museum of Comparative Zoology, Harvard University.* MOLLUSCA, articles on related taxonomic groups

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Cloud, Dr Preston E, Jr *U S Geological Survey* CORAL REEF; REEF, other articles on types of reef.

Cobban, Dr William Aubrey *Geologist, U S Geological Survey.* CRETACEOUS, MESOZOIC

Cobine, Dr James Dillon *General Electric Research Laboratory* GAS TUBE, THYRATRON, VOLTAGE-REGULATOR TUBE

Cochran, David *General Electric Company* JET PROPULSION, PROPULSION

Cochrane, Prof John D *Assistant Professor, Department of Oceanography, Texas A & M College* SEA WATER (in part)

Code, Prof. Charles Frederick *Mayo Foundation and Mayo Clinic* DIGESTIVE SYSTEM (in part)

Coggeshall, Dr Ivan S *Manager, Technical Operations Services, American Institute of Electrical Engineers* TELEGRAPHY (in part)

Cohart, Prof Edward Maurice *Department of Public Health, Yale University School of Medicine* PUBLIC HEALTH

Cohen, Charles A *Research Associate, Esso Research and Engineering Company* ADDITION REACTION, DIENE, UNSATURATED HYDROCARBONS, other articles on unsaturated hydrocarbons

Cole, Prof LaMont C *Department of Zoology, Cornell University* POPULATION DYNAMICS.

Cole, Marc *Senior Chemist, Production and Development, Hoffmann-LaRoche, Inc* VITAMIN B_6 (in part)

Cole, Dr W Storrs *Professor of Geology and Chairman of Department, Cornell University* NUMMULITES

Coleal, Ernest. *Chief, Engineering Section, Experimental Track Branch, Air Force Flight Test Center, Edwards Air Force Base, California* ROCKET-SLED TESTING

Coleman, Dr Donald G *Chief, Research Publications and Information, Forest Products Laboratory, U S Department of Agriculture* WOOD FIBER PRODUCTS

Coleman, Prof. Nathaniel Terry. *Soils Department, North Carolina State College* SOIL (in part).

Comings, Dean Edward Walter. *School of Engineering, University of Delaware.* AUTOCLAVE; HIGH-PRESSURE PROCESSSES

Comstock, John Paul *Naval Architect (retired).* SHIPBUILDING.

Condon, Prof. E. U. *Wayman Crow Professor of Physics, Washington University.* ADHESION, MOLECULAR; ISOTOPIC SPIN.

Conklin, Groff *Senior Researcher, Scientific Investigative Group, Bell System Science Series* Series of miscellaneous articles.

Conner, Dr. Herbert W. *William Wrigley Jr. Company.* FOOD MANUFACTURING (in part)

Connors, James F. *Head, Section B, 10 x 10 Foot Supersonic Wind Tunnel Branch, Propulsion Aerodynamics Division, National Aeronautics and Space Administration.* DIFFUSER; SUPERSONIC DIFFUSER (both in part)

Conquergood, Charles R *Chairman of Board, Canada Printing Ink Company, Limited, Ontario, Canada* INK

Conrad, Prof Albert Godfrey *Chairman, Department of Electrical Engineering, Yale University* ELECTRICAL ENGINEERING, INDUCTION MOTOR, MECHANICAL RECTIFIER

Cook, Dr Gerhard A *Assistant Manager, Research Laboratory, Linde Company, Division of Union Carbide Corporation* HELIUM, OXYGEN, OZONE, articles on atmospheric gases

Cooley, Austin G *Vice-President, Westrex Corporation* FACSIMILE

Cooley, Prof Hollis R *New York University* ALGEBRA, BINOMIAL THEOREM, ROOT-MEAN-SQUARE

Cooley, Dr William E *Research Chemist, Procter & Gamble Company* GOLD, NICKEL, SILVER, ZINC

Coons, Dr George Herbert *Collaborator, Agriculture Research Service, U S Department of Agriculture* SUGAR BEET (in part)

Copeland, Prof D. Eugene *Chairman, Zoology Department, Tulane University* SWIM BLADDER

Copenhaver, Prof. W M *Professor of Anatomy, College of Physicians and Surgeons, Columbia University* CARDIOVASCULAR SYSTEM (in part)

Corben, Dr Herbert Charles *Ramo-Wooldridge* CENTRODE, DYNAMICS, KINEMATICS, MOTION.

Core, Dr Earl L *Chairman, Department of Biology, West Virginia University* HERBARIUM, PLANT KEYS, PLANT NAMES, other articles in botany

Corey, Horace Edmund, Jr *Transmission Maintenance and Coordination Engineer, American Telephone and Telegraph Company* TELEPHONE SERVICE (in part)

Corliss, Dr John O *Associate Professor of Zoology, University of Illinois* CILIOPHORA, articles on related taxonomic groups

Corliss, William *Flight Propulsion Laboratory, General Electric Company* NUCLEAR AIRCRAFT PROPULSION (in part), NUCLEAR ROCKET.

Cornish, Dr Joseph Jenkins, III *Aerophysics Department, Mississippi State University* BOUNDARY-LAYER FLOW

Corson, Almon J *Consulting Engineer, Instrument Department, General Electric* POTENTIOMETER (VOLTAGE MEASUREMENT), VOLTAGE MEASUREMENT (in part), VOLTMETER

Cotton, Irwin W *Retired* THERMOSTAT

Couch, Prof. John N *Kenan Professor of Botany, University of North Carolina* ACTINOPLANACEAE

Coulombre, Dr Alfred J *Department of Anatomy, Yale University School of Medicine* EYE (in part)

Court, Dr Arnold. *Forest Service, U.S. Department of Agriculture* AIR TEMPERATURE, FROST, TEMPERATURE INVERSION; other articles in meteorology.

Cowart, Vice-Admiral Kenneth Keith *Engineer-in-Chief, U.S Coast Guard (Retired).* MARINE ENGINEERING; MARINE MACHINERY (in part); SHIP PROPULSION.

Cowles, Prof Philip B. *Professor of Microbiology, Yale University School of Medicine* BACTERIA, LYSOGENIC, BACTERIOPHAGE; COLIPHAGE, other articles in medical microbiology

Cox, Dr Charles S *Scripps Institution of Oceanography* WAVE (CAPILLARY); WAVE (INTERNAL).

Cox, Dr. Everett Franklin. *Manager of Research, Whirlpool Corporation* ATMOSPHERIC ACOUSTICS.

Cox, Dr Gertrude M. *Head, Statistics Research Division, The Research Triangle Institute* EXPERIMENT.

Coxeter, Prof. H S M. *Professor of Mathematics, University of Toronto* POLYTOPES, REGULAR

Crabill, Dr Ralph Edwin. *Division of Insects, United States National Museum* CHILOPODA, MYRIAPODA; PAUROPODA; SYMPHYLA

Crafts, Prof Alden S *Department of Botany, University of California* DEFOLIANT, HERBICIDE; SOIL STERILIZATION.

Craig, Prof Homer Vincent *Research Specialist, Boeing Airplane Company, Professor of Mathematics, University of Texas.* GEOMETRY, RIEMANNIAN; GRADIENT OF A SCALAR, GREEN'S THEOREM, other articles in mathematics

Craine, Prof Lyle E *Department of Conservation, School of Natural Resources, University of Michigan* LAND USE PLANNING

Cramer, Prof Dr Friedrich D *Professor of Organic Chemistry, Technical University, Darmstadt, Germany* CLATHRATE COMPOUNDS

Crampton, Dr Donald Kelsey *Chase Brass & Copper Company, Inc* COPPER ALLOYS.

Crary, Dr Albert Paddock. *National Science Foundation* ICE ISLAND

Craven, Dr John Pinna *Chief Scientist, Special Projects Office, U.S Bureau of Weapons* HYDROFOIL CRAFT

Crentz, William L *Assistant to Chief, Division of Bituminous Coal, U.S Bureau of Mines* MINING OPERATING FACILITIES (in part)

Creson, William K *Consulting Engineer, Ross Gear and Tool Company, Inc* ACKERMAN STEERING, AUTOMOTIVE STEERING, STEERING, POWER.

Crittenden, Dr Charles V *Earth Sciences Editor, McGraw-Hill Encyclopedia of Science and Technology* AIR, CYCLONE, ISOSTASY, NORTH AMERICA (in part)

Crockford, Prof H D *Department of Chemistry, University of North Carolina* HYDROGEN ION (in part)

Croneis, Dr Carey. *Provost and Harry Carothers Wiess Professor of Geology, Rice Institute.* ANNELIDA FOSSILS.

Crouse, William H *Editor-in-Chief, McGraw-Hill Encyclopedia of Science and Technology* AUTOMOTIVE SUSPENSION, JOINT (MECHANICAL), SOLAR HEATING; VOLTAGE REGULATOR, AUTOMOTIVE

Crow, Prof James F *Professor of Medical Genetics, University of Wisconsin.* EUGENICS, HARDY-WEINBERG FORMULA, HETEROSIS, HUMAN GENETICS (in part).

Crowell, Dr Sears *Associate Professor of Zoology, Indiana University* HYDROIDA, HYDROZOA, articles on related taxonomic groups

Cubberley, Adrian H *Product Development Coordinator, Plastics and Coal Chemicals Division, Allied Chemical Corporation* NIACIN (in part).

Coleman, Prof. Nathaniel Terry. *Soils Department, North Carolina State College.* SOIL (in part).

Comings, Dean Edward Walter *School of Engineering, University of Delaware* AUTOCLAVE; HIGH-PRESSURE PROCESSSES

Comstock, John Paul *Naval Architect (retired).* SHIPBUILDING

Condon, Prof. E. U. *Wayman Crow Professor of Physics, Washington University.* ADHESION, MOLECULAR; ISOTOPIC SPIN

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Conner, Dr. Herbert W. *William Wrigley Jr Company* FOOD MANUFACTURING (in part)

Connors, James F. *Head, Section B, 10 x 10 Foot Supersonic Wind Tunnel Branch, Propulsion Aerodynamics Division, National Aeronautics and Space Administration* DIFFUSER; SUPERSONIC DIFFUSER (both in part).

Conquergood, Charles R *Chairman of Board, Canada Printing Ink Company, Limited, Ontario, Canada* INK.

Conrad, Prof. Albert Godfrey. *Chairman, Department of Electrical Engineering, Yale University.* ELECTRICAL ENGINEERING, INDUCTION MOTOR, MECHANICAL RECTIFIER

Cook, Dr. Gerhard A *Assistant Manager, Research Laboratory, Linde Company, Division of Union Carbide Corporation* HELIUM; OXYGEN, OZONE, articles on atmospheric gases

Cooley, Austin G *Vice-President, Westrex Corporation* FACSIMILE

Cooley, Prof Hollis R *New York University* ALGEBRA, BINOMIAL THEOREM, ROOT-MEAN-SQUARE.

Cooley, Dr William E *Research Chemist, Procter & Gamble Company* GOLD; NICKEL; SILVER, ZINC

Coons, Dr. George Herbert *Collaborator, Agriculture Research Service, U S Department of Agriculture* SUGAR BEET (in part)

Copeland, Prof D. Eugene *Chairman, Zoology Department, Tulane University.* SWIM BLADDER

Copenhaver, Prof W M *Professor of Anatomy, College of Physicians and Surgeons, Columbia University* CARDIOVASCULAR SYSTEM *(in part).*

Corben, Dr Herbert Charles *Ramo-Wooldridge* CENTRODE, DYNAMICS, KINEMATICS, MOTION

Core, Dr Earl L. *Chairman, Department of Biology, West Virginia University* HERBARIUM; PLANT KEYS, PLANT NAMES, other articles in botany

Corey, Horace Edmund, Jr *Transmission Maintenance and Coordination Engineer, American Telephone and Telegraph Company* TELEPHONE SERVICE (in part)

Corliss, Dr John O *Associate Professor of Zoology, University of Illinois* CILIOPHORA, articles on related taxonomic groups

Corliss, William *Flight Propulsion Laboratory, General Electric Company* NUCLEAR AIRCRAFT PROPULSION (in part), NUCLEAR ROCKET

Cornish, Dr Joseph Jenkins, III *Aerophysics Department, Mississippi State University* BOUNDARY-LAYER FLOW

Corson, Almon J *Consulting Engineer, Instrument Department, General Electric* POTENTIOMETER (VOLTAGE MEASUREMENT), VOLTAGE MEASUREMENT (in part), VOLTMETER

Cotton, Irwin W. *Retired* THERMOSTAT

Couch, Prof John N *Kenan Professor of Botany, University of North Carolina* ACTINOPLANACEAE

Coulombre, Dr Alfred J. *Department of Anatomy, Yale University School of Medicine* EYE (in part)

Dapples, Prof. Edward C. *Department of Geology, Northwestern University* AUTHIGENIC MINERALS; DIAGENESIS.

Daugherty, Prof. Robert Long *Professor emeritus of Mechanical and Hydraulic Engineering, California Institute of Technology* FLOW OF FLUIDS

Davis, Dr. Charles C *Associate Professor, Department of Biology, Western Reserve University.* MONSTRILLOIDA.

Davis, Dr Charles Moler. *Professor of Geography and Chairman of Department of Geography, University of Michigan* FOREST VEGETATION; VEGETATION ZONES (WORLD); other articles in physical geography

Davis, D Dwight. *Curator of Vertebrate Anatomy, Chicago Natural History Museum* MAMMALIA; articles on related taxonomic groups

Davis, Dr David E *Department of Zoology, Pennsylvania State University* ECOLOGIC INTERACTIONS

Davis, Dr H Chandler. *Associate Editor, 'Mathematical Reviews'* MATHEMATICAL NOTATION, CONTEMPORARY (in part).

Davis, Dr Hallowell *Director of Research, Central Institute for the Deaf* HEARING AID

Davis, Dr John H *Professor of Botany, University of Florida* MANGROVE SWAMP

Davis, Major General Leighton *Commander, Air Force Missile Test Center, Patrick Air Force Base, Florida* ARMAMENT, AIR

Davis, Rowland F *Products Planning Engineer, American Telephone and Telegraph Company* INTERCOMMUNICATING SYSTEM, TELEPHONE, other articles on telephones

Deacon, Dr George E R *Director, National Institute of Oceanography, Surrey, England* ANTARCTIC OCEAN

De Cicco, Dr John *De Paul University* GEOMETRY, NONEUCLIDEAN

de Florez, Admiral Luis *Consulting Engineer* HUMAN ENGINEERING

DeGarmo, Dr Oliver *Monsanto Chemical Company,* PESTICIDES (in part)

Dekeyser, Prof Dr Willy Clement, *University of Ghent, Belgium.* COORDINATION NUMBER, CRYSTAL STRUCTURE, CRYSTALLOGRAPHY, other articles in crytallography

Dekker, Dr A J *Professor of Electrical Engineering, University of Minnesota Institute of Technology* FIELD EMISSION, SECONDARY EMISSION, THERMIONIC EMISSION, other articles on electronic properties of solids

Delahay, Prof Paul *Boyd Professor of Chemistry, Louisiana State University* COULOMETER, ELECTROLYSIS, OVERVOLTAGE; other articles in physical chemistry

de Launay, Dr Jules *Head of Cryogenics Branch, Naval Research Laboratory* HYSTERESIS, THERMAL, LATTICE VIBRATIONS, PHONON, SPECIFIC HEAT OF SOLIDS.

Delevoryas, Prof Theodore *Assistant Professor of Botany, Yale University* CYCADEOIDALES

de Montmollin, Dr. Fernand *Hoffmann-LaRoche Inc. (retired)* THIAMINE (in part)

Den Hartog, Prof Jacob P *Department of Mechanical Engineering, Massachusetts Institute of Technology* BRIDGE VIBRATION, MECHANICAL VIBRATION, SHAFT BALANCING.

Denison, Dr Robert H *Curator of Fossil Fishes, Chicago Natural History Museum* OSTEOSTRACI; articles on related fossil groups

Denny-Brown, Dr Derek E *Professor of Neurology, Harvard University Medical School.* ELECTROMYOGRAM

Cubicciotti, Dr. Daniel. *Research Chemist, Stanford Research Institute* HAFNIUM; ZIRCONIUM.

Cuckler, Lee E *Robertshaw-Fulton Controls Company, Aeronautical and Instrument Division.* MOISTURE-CONTENT MEASUREMENT.

Culbertson, Dr Joseph O *Leader, Industrial Crops Investigations, Crops Research Division, U.S. Department of Agriculture.* FLAX (in part).

Cumberland, Dr. Kenneth B *Professor of Geography, University of Auckland, New Zealand* AUSTRALIA AND NEW ZEALAND

Cumming, Donald C. *Headquarters of Manufacturing Laboratory, Westinghouse Electric Corporation.* ASSEMBLY METHODS

Cummins, Prof Harold *Professor of Anatomy and Assistant Dean, School of Medicine, Tulane University.* EPIDERMAL RIDGES, INTEGUMENTARY PATTERNS

Cunningham, Prof Burris B *Department of Chemistry and Radiation Laboratory, University of California* CURIUM, METALLOACID ELEMENTS, PERIODIC TABLE; TRANSITION ELEMENTS

Curdts, E B. *Director of Engineering, James G Biddle Company* FREQUENCY MEASUREMENT (in part).

Currie, Ronald I *Senior Scientific Officer of National Institute of Oceanography, England* SEA WATER FERTILITY (in part)

Curtin, Dr Charles B *Life Sciences Editor, McGraw-Hill Encyclopedia of Science and Technology* DENTITION, MYIASIS, SENSE ORGAN, series of articles in animal taxonomy

Curtis, Prof John T *University of Wisconsin* CLIMAX COMMUNITY

Curtiss, Prof C F *Professor of Chemistry, University of Wisconsin* GAS (in part)

Curtiss, Dr Leon F *National Bureau of Standards* CURIE, RAD, RADIOACTIVITY STANDARDS, ROENTGEN UNIT

Czarnecki, Edwin Gregory *Department Manager, Structures Technology Department, Aero-Space Division, Boeing Airplane Company* SPACECRAFT STRUCTURE

D

Dachille, Dr Frank *Research Associate in Geochemistry, Pennsylvania State University* HIGH-PRESSURE PHENOMENA (in part)

Dahl, Dr Lawrence F *Assistant Professor of Chemistry, University of Wisconsin* X-RAY DIFFRACTION (in part)

Dale, Prof Dr Walter Max *Head, Department of Biochemistry, Christie Hospital, Manchester, England* RADIATION BIOCHEMISTRY

Dalitz, Prof Richard H. *Physics Department and Enrico Fermi Institute for Nuclear Studies, University of Chicago* HYPERON, MESON, STRANGE PARTICLE, other articles on elementary particles

Dalton, Dr Albert J *National Cancer Institute* GOLGI COMPONENT.

Damon, Dr Paul Edward *Geology Department, University of Arizona* ATMOSPHERE, GEOCHEMISTRY OF, TERRESTRIAL NUCLEAR REACTIONS

Dan, Dr Jean C *Lecturer in Embryology, Ochanomizu University, Tokyo, Japan* INVERTEBRATE EMBRYOLOGY

Dana, Alan Standish *Consulting Engineer for The Kerite Company* INSULATION, ELECTRIC (in part)

Dana, Dr Samuel Trask *Dean emeritus, School of Natural Resources, University of Michigan* FOREST AND FORESTRY

Daniels, Prof. Farrington *Professor emeritus of Chemistry, University of Wisconsin* CHAIN REACTION, CHEMICAL, HALF-LIFE (in part), KINETICS (CHEMICAL), PHYSICAL CHEMISTRY

Donn, Prof William L *Department of Geology, Brooklyn College* SEICHE

Doob, Prof Joseph Leo *Professor of Mathematics, University of Illinois* STOCHASTIC PROCESS.

Dorcus, Prof Roy Melvin *University of California at Los Angeles* HYPNOSIS.

Dorf, Prof Erling *Professor of Geology, Princeton University* PALEOBOTANY (in part); PETRIFIED FORESTS

Dorfman, Dr Ralph I *Director of Laboratories, Worcester Foundation for Experimental Biology* BILE ACID, DIGITOXIGENIN; PROGESTERONE, other articles on adrenal cortex steroids

Dornfeld, Dr Ernst John *Chairman, Department of Zoology, Oregon State College* CELL (BIOLOGICAL)—in part.

Dossel, Dr William Edward *Assistant Professor of Anatomy, University of North Carolina School of Medicine.* PARATHYROID GLAND (in part)

Doudoroff, Prof Michael *Professor of Bacteriology, University of California* CARBOHYDRATE METABOLISM, KREBS CYCLE, other articles on phosphate compounds in metabolism

Dougherty, Dr Ellsworth C. *University of California School of Medicine* CAPRELLIDEA.

Dougherty, Richard Erwin *Consulting Engineer* RAILROAD ENGINEERING

Douglas, Donald W, Jr *President, Douglas Aircraft Company, Inc* AIRCRAFT TESTING

Douglas, Prof Howard C *Department of Microbiology, University of Washington* HYPHOMICROBIALES, MICROCOCCACEAE; NEISSERIACEAE

Douglass, Prof Raymond Donald *Professor of Mathematics, Massachusetts Institute of Technology.* NOMOGRAPH

Dowd, James J *Chief, Mining and Preparation Section, U.S Bureau of Mines* MINING, STRIP

Doyle, Edwin S *National Canners Association Research Laboratory* FOOD ENGINEERING (in part)

Draper, Dr Arthur L *Assistant Professor of Chemistry, Texas Technological College* ADSORPTION, ELECTROSTATIC PRECIPITATOR, SURFACE PHENOMENON—all in part

Dresden, Prof Max *Department of Physics, Northwestern University* BOLTZMANN STATISTICS, KINETIC THEORY OF MATTER, STATISTICAL MECHANICS, other articles on statistical physics.

Droessler, Dr Earl G *Program Director for Atmospheric Sciences, National Science Foundation* NAVAL METEOROLOGY

Duckworth, Prof Henry Edmison *Department of Physics, McMaster University, Canada* BINDING ENERGY, NUCLEAR (in part), ISOTOPE, other articles on atomic and nuclear physics

Duke, Dr Kenneth L *Associate Professor of Anatomy, Duke University Medical Center* OVARY (in part)

Duley, Dr Frank L. *Colorado State University, Fort Collins, Advisor in Soils, University of Peshawar, West Pakistan.* SOIL (in part)

DuMond, Prof Jesse William Monroe *California Institute of Technology* COMPTON EFFECT

Dunbar, Dr Carl O. *Professor emeritus of Paleontology and Stratigraphy, Yale University* FOSSIL; PALEONTOLOGY, PERMIAN, other articles on fossils

Duncan, Charles Clifford *Assistant Vice-President, American Telephone and Telegraph Company* PRIVACY SYSTEMS (SCRAMBLING), TELEPHONE SERVICE (in part); TELEPHOTOGRAPHY

Duncan, Dr Helen *U.S. Geological Survey, U.S. National Museum* BRYOZOA FOSSILS

Deno, Dr Richard A. *Professor of Pharmacognosy, University of Michigan.* PHARMACOGNOSY, PHARMACY.

Derge, Prof. Gerhard *Carnegie Institute of Technology* FERROALLOY; STEEL MANUFACTURE

Derosier, Dr. Norman. *Department of Horticulture, Purdue University* FOOD MANUFACTURING (in part).

DeTar, Prof. DeLos F *Department of Chemistry, Florida State University.* RESONANCE (MOLECULAR STRUCTURE).

De Vaucouleurs, Prof Gerard H *Associate Professor of Astronomy, University of Texas* JUPITER; MARS; PLANET; other articles in astronomy

DeVaney, Dr. Fred D. *Director of Metallurgy and Research, Pickands, Mather, and Company.* MAGNETIC SEPARATION METHODS.

DeVore, Dr George W. *Department of Geology, Florida State University* AMPHIBOLE; PYROXENE, articles on related minerals

Dexter, Dr Theodore Henry *Research Supervisor, Inorganic Chemistry, Hooker Chemical Corporation Research Center* HYDRAZINE

Diaz, Prof. Joaquin Basilio *Research Professor, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.* DIFFERENTIAL EQUATION.

Dice, Dr Lee R *Professor emeritus of Zoology, University of Michigan* ECOLOGY, HUMAN.

Dick, Prof B G *Assistant Professor of Physics, University of Utah* INSULATOR, ELECTRIC, IONIC CRYSTALS, MADELUNG CONSTANT

Dieke, Prof G H *Chairman, Department of Physics, Johns Hopkins University* ELECTROOPTICS; FARADAY EFFECT, KERR EFFECT, MAGNETOOPTICS, ZEEMAN EFFECT (in part).

Dienes, Dr Louis L *Massachusetts General Hospital, Boston* PLEUROPNEUMONIALIKE ORGANISM

Dienst, Prof Robert Barton *Chairman, Department of Medical Microbiology and Public Health, Medical College of Georgia.* GRANULOMA INGUINALE (in part)

Dietrich, Prof Dr Gunter Otto *Director, Institute of Oceanography, University of Kiel, Germany* ATLANTIC OCEAN, OCEAN CURRENTS (in part)

Dietz, Dr Robert Sinclair *U S Navy Electronics Laboratory, San Diego* BATHYSCAPH, CONTINENTAL SHELF AND SLOPE

Dill, Robert Floyd *Marine Geologist, Sea Floor Studies Section, U.S Navy Electronics Laboratory, San Diego.* SCUBA, SKIN DIVING, UNDERWATER PHOTOGRAPHY (in part)

Diller, Dr Oliver Daniel *Chairman, Department of Forestry, Ohio Agricultural Experiment Station* FOREST CONSERVATION

Dinsmore, Ray Putnam *Vice-President, Research and Development, Goodyear Tire and Rubber Company* RUBBER

Dinsmore, Commander Robertson Pickett *International Ice Patrol, U.S Coast Guard.* ICEBERG

Dodds, Robert Hungerford *Project Engineer, Gibbs and Hill, Inc* PHOTOGRAMMETRY, SURVEYING, TOPOGRAPHIC SURVEYING AND MAPPING, other articles in civil engineering

Dodson, Dr. Edward O *Department of Biology, University of Ottawa, Canada* PROTECTIVE COLORATION, SEXUAL DIMORPHISM

Dollear, Frank Gilbert *Head, Industrial Oils Investigations, Southern Utilization Research and Development Division, U S Department of Agriculture* BUTTER; FAT AND OIL, EDIBLE (both in part), MARGARINE

Dommasch, Daniel Otto *President, Dodco, Inc.* AIRCRAFT INSTRUMENT PANEL (in part); FLIGHT CHARACTERISTICS

Eide, Prof Carl J *Professor of Plant Pathology, University of Minnesota*. PLANT DISEASE (in part); TURNIP

Eidensohn, Samuel *Chief Project Engineer, Industrial Division, Electric Storage Battery Company* DRY CELL, NUCLEAR BATTERY, WET CELL; other articles on batteries

Einset, Dr John *Professor of Pomology, Cornell University* GRAPE CULTURE (in part)

Elderfield, Prof Robert Cooley *Department of Chemistry, University of Michigan* CARBANION; CARBONIUM ION; ORGANIC CHEMISTRY

Elias, Dr M Hans *Department of Anatomy, Chicago Medical School* LIVER (in part).

Eliassen, Prof Arnt *University of Oslo, Norway*. METEOROLOGY (in part)

Ellis, Dr Nathan Kent *Assistant Director, Purdue University Experiment Station* TOMATO

Ellison, Prof Samuel P., Jr *Professor of Geology, Chairman of Department of Geology, University of Texas* CONODONT

Eltgroth, George V *Patent Counsel, Industrial Electronics Division, General Electric Company* PATENT

Ely, F G *Research and Development Division, Babcock and Wilcox Company* BOILER WATER, STEAM BOILER, WATER-TUBE BOILER, other articles on steam power

Emerson, Lewis P *Engineer in Charge of Flow Measurement, Foxboro Company* FLOW MEASUREMENT (in part).

Emerson, Prof Ralph. *Department of Botany, University of California* PHYCOMYCETES

Emerson, Dr William Keith *American Museum of Natural History, New York* SCAPHOPODA

Emmel, Dr Victor M *Associate Professor of Anatomy, University of Rochester School of Medicine and Dentistry* DIGESTIVE SYSTEM (in part)

Engelhart, R W *Parker Rust Proof Company, Detroit* METAL COATINGS (in part)

English, Prof Van H *Professor of Geography, Dartmouth College* EQUINOX, GEOGRAPHY, MATHEMATICAL, INTERNATIONAL DATE LINE, other articles in physical geography

Engström, Prof Arne *Head, Department Medical Physics, Karolinska Institute, Stockholm, Sweden* MICROSCOPE, X-RAY

Epstein, Prof Samuel *California Institute of Technology* GEOLOGIC THERMOMETRY (in part)

Epstein, Samuel *Technical Adviser, Bethlehem Steel Company* STEEL

Epstein, Dr Samuel S *Chief Chemist and Vice-President, Kirsch Beverages, Inc, and NO-CAL Corporation* FOOD MANUFACTURING (in part)

Erdélyi, Prof A *Professor of Mathematics, California Institute of Technology* ELLIPTIC FUNCTION AND INTEGRAL, SPHERICAL HARMONICS

Ericson, David Barnard *Lamont Geological Observatory* MARINE SEDIMENTS (in part)

Eriksson, Dr Erik *International Meteorological Institute, Stockholm, Sweden* ATMOSPHERIC CHEMISTRY

Esau, Prof Katherine *Professor of Botany, University of California* PLANT ORGANS, SECRETORY STRUCTURES, PLANT, VASCULAR BUNDLES, other articles in plant anatomy

Essig, Prof E O *Department of Entomology, University of California* THYSANOPTERA, articles on related taxonomic groups

Duncombe, Dr. Raynor Lockwood *U S Naval Observatory* CELESTIAL MECHANICS; ORBITAL MOTION, PERTURBATION (ASTRONOMY), other articles in celestial mechanics.

Dunegan, John Clymer. *Agricultural Consultant.* CHERRY; PEACH, PLUM (all in part).

Dunkle, Dr. David H *U S. National Museum, Smithsonian Institution* PLACODERMI; articles on related fossil groups

Dunlop, Charles A *Consultant; Professional Engineer* OIL AND GAS WELLS (in part).

Dunn, Dr Hugh K *Member Technical Staff, Bell Telephone Laboratories, Inc.* MASKING (SOUND); PHONETICS; PSYCHOACOUSTICS, VOCODER

Dunn, Dr J Avery *Sales Manager, Atlantic Gelatin, Division of General Foods Corporation* GELATIN

Duntley, Dr Seibert Quimby *Visibility Laboratory, Scripps Institution of Oceanography, University of California* SEA WATER (in part)

E

Eardley, Dean Armand John *College of Mines and Mineral Industries, University of Utah* CORDILLERAN BELT, MOUNTAIN SYSTEMS, TECTONIC PATTERNS

Ebert, Prof James David *Director, Department of Embryology, Carnegie Institution of Washington* HEMATOPOIESIS (in part)

Eckart, Prof Carl *University of California at La Jolla* SEA WATER (in part)

Eckels, Prof Arthur R *Department of Electrical Engineering, University of Vermont* COMMUTATION, SLIP RINGS (in part), WINDINGS (ELECTRIC MACHINERY), other articles in electrical engineering

Eckhardt, Dr E. A *Vice-President (retired), Gulf Research and Development Company* GEOPHYSICAL EXPLORATION, PROSPECTING, PETROLEUM (in part)

Economou, George A *Staff Engineer, Perkin-Elmer Corporation* OPTICAL TRACKING INSTRUMENTS

Eddy, Dr Samuel *Department of Zoology, University of Minnesota* LIMNOLOGY

Edgerton, Prof Harold E *Massachusetts Institute of Technology* STROBOSCOPIC PHOTOGRAPHY, UNDERWATER PHOTOGRAPHY (in part)

Edwards, Prof John O *Associate Professor of Chemistry, Brown University* IRON

Edwards, Dr Russell K *Associate Professor of Chemistry, Illinois Institute of Technology* CARBIDE, NITRIDE OXIDE

Egan, John Joseph *Marketing Research Division, Union Carbide Metals Company* IRON ALLOYS (in part)

Eggers, Dr Alfred J, Jr *Chief, Vehicle-Environment Division, Ames Research Center, National Aeronautics and Space Administration* NOSE CONE, REENTRY

Eggertsen, Dr Frank Thomas *Research Chemist, Shell Development Company* GAS ANALYSIS, GAS CHROMATOGRAPHY

Egler, Dr Frank E *Consultant in Vegetation Science* PLANT GEOGRAPHY

Ehricke, Krafft A *Director, Centaur-Spacecraft Program, Convair-Astronautics.* ELECTROMAGNETIC PROPULSION, ION PROPULSION, MAGNETOGAS DYNAMICS, SOLAR ENGINE

Ehrlich, Dr. John *Laboratory Director in Antibiotic Research, Parke, Davis, and Company* CHLORAMPHENICOL

Ehrlich, Dr. Paul R. *Assistant Professor of Biological Sciences and Curator of the Entomological Collections, Stanford University* LEPIDOPTERA.

Ferguson, Eugene S *Curator, Division of Mechanical and Civil Engineering, U.S. National Museum, Smithsonian Institution* CAM MECHANISM; FOUR-BAR LINKAGE; VELOCITY ANALYSIS; other articles in machine design

Ferguson Wood, Edward James *Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Australia* MARINE MICROBIOLOGY.

Ferris, Gordon F. *Natural History Museum, Stanford University* ANOPLURA, ENTOMOLOGY, ECONOMIC; INSECTA; MALLOPHAGA

Ferry, Dr James F. *Life Sciences Editor, McGraw-Hill Encyclopedia of Science and Technology.* CLASSIFICATION, BIOLOGICAL; EGG (FOWL); PLANT RESPIRATION, WILLOW

Feshbach, Prof Herman *Department of Physics, Massachusetts Institute of Technology.* PERTURBATION (MATHEMATICS).

Fields, Paul R. *Senior Chemist, Argonne National Laboratory, Illinois* NOBELIUM

Filmer, Dr Robert S *New Jersey Agricultural Experiment Station, Rutgers University* BEE AND BEEKEEPING (in part).

Finberg, Alfred J. *Consultant in Food Technology* FOOD MANUFACTURING (in part)

Fink, Donald Glen *Research Division, Philco Corporation* TELEVISION STANDARDS

Finland, Dr Maxwell *Harvard University Medical School and Boston City Hospital* PNEUMOCOCCUS, PNEUMONIA.

Fisher, Prof Russell Arden. *Professor of Physics, Northwestern University.* DEGREE OF FREEDOM (MECHANICS); EULER'S EQUATIONS OF MOTION, KINETICS (CLASSICAL MECHANICS).

Fisher, Dr W Allan *Manager of Research, Dyestuffs and Pigments, National Aniline Division, Allied Chemical Corporation.* DIAZOTIZATION

Fisk, Prof Nelson S *Department of Civil Engineering, Columbia University.* CENTROIDS OF AREA AND LINES; EQUILIBRIUM OF FORCES, STATISTICS, other articles in civil engineering

Fiske, Dr Milan D *General Electric Research Laboratory* MEISSNER EFFECT, SUPERCONDUCTIVITY

FitzPatrick, Dean James L G *Professor of Mechanical Technology, Staten Island Community College* ORNITHOPTER.

Fleminger, Dr Abraham *Research Biologist, Scripps Institution of Oceanography* BRANCHIURA, LERNAEOPODOIDA, NOTODELPHYOIDA.

Fletcher, Prof Harvey *Physics Department, Brigham Young University* ACOUSTICS, FLETCHER-MUNSON CONTOURS; PHYSIOLOGICAL ACOUSTICS

Flexser, Dr Leo A *Director of Chemical Production, Hoffmann-LaRoche Inc* RIBOFLAVIN (in part)

Flint, Prof Richard Foster *Professor of Geology, Yale University* GLACIAL EPOCH; PLEISTOCENE, QUATERNARY, RECENT

Flood, James E *Solid-Liquid Separation Consultant, E. I du Pont de Nemours and Company* CENTRIFUGATION

Flynn, John P *Associate Professor of Psychology, Laboratory of Applied Biodynamics, Yale University* ELECTROENCEPHALOGRAPHY, NEUROPHYSIOLOGY; PSYCHOGALVANIC RESPONSE.

Foley, Francis B *Consulting Metallurgist, International Nickel Company* STAINLESS STEEL

Fontana, Prof Mars Guy *Chairman, Department of Metallurgical Engineering, Ohio State University* CORROSION (in part)

Foote, Dr Richard Herbert. *Entomology Research Division, Agricultural Research Service, U.S. Department of Agriculture.* DIPTERA.

Etherington, Harold *Manager, Nuclear Power Department, Allis-Chalmers Manufacturing Company* NUCLEAR ENGINEERING

Ettenberg, Eugene M *Lecturer, Graphic Arts, Columbia University* TYPE (PRINTING).

Evans, Prof F. Gaynor *Department of Anatomy, University of Michigan School of Medicine.* SKELETAL SYSTEM (in part).

Evans, Prof. Francis C. *Professor of Zoology, University of Michigan* POPULATION DISPERSION.

Evans, Dr John W. *Director, Sacramento Peak Observatory, Geophysics Research Directorate, U.S. Air Force.* SUN; series of related articles.

Evans, Prof. Robley D. *Department of Physics, Massachusetts Institute of Technology* ALPHA RAYS; HALF-LIFE (in part); RADIOACTIVITY.

Evans, Dr. Theodore W. *Shell Development Company* PETROCHEMICAL (in part).

Everetts, John, Jr. *Consulting Engineer, Charles S Leopold, Inc., Engineers.* DEHUMIDIFIER, PSYCHROMETRICS.

Everitt, Dean William Littell *Dean of Engineering, University of Illinois* COMMUNICATIONS, ELECTRICAL.

Ewing, Dr. John I *Research Geophysicist, Lamont Geological Observatory* SUBMARINE TOPOGRAPHY (in part)

Ewing, Dr. Maurice *Higgins Professor of Geology, Columbia University; Director, Lamont Geological Observatory* SUBMARINE TOPOGRAPHY (in part)

Eyring, Prof Henry *University of Utah* RHEOLOGY

F

Failla, Dr Gioacchino *Director, Radiological Research Laboratory, Columbia University* NUCLEAR RADIATION (BIOLOGY)—in part, RADIOLOGY.

Fairbank, Prof William M *Professor of Physics, Stanford University* SUPERFLUIDITY

Fan, Prof H Y *Physics Department, Purdue University* CYCLOTRON RESONANCE EXPERIMENTS, SEMICONDUCTOR, articles in solid-state physics

Fankhauser, Prof Gerhard *Department of Biology, Princeton University.* ANDROGENESIS, EMBRYOGENESIS, GYNOGENESIS, MEROGONY

Fankuchen, Prof I *Polytechnic Institute of Brooklyn* X-RAY CRYSTALLOGRAPHY

Fawcett, Prof Don Wayne *Hersey Professor of Anatomy, Harvard Medical School* CELL-SURFACE DIFFERENTIATION, MITOCHONDRIA

Feldman, Cyrus *Supervisor, Spectrochemical and X-ray Analysis, Oak Ridge National Laboratory* FLAME PHOTOMETRY, SPECTROCHEMICAL ANALYSIS

Fell, Dr Howard Barraclough *Associate Professor of Zoology, Victoria University of Wellington, New Zealand* ECHINODERMATA, articles on related taxonomic groups

Feller, Prof William *Princeton University* COMBINATION AND PERMUTATION, DISTRIBUTION (PROBABILITY), PROBABILITY

Fellers, Dr Carl R. *Food Consultant* FOOD ENGINEERING (in part)

Fellinger, Robert Cecil *Associate Professor of Mechanical Engineering, Iowa State University of Science and Technology* BELT DRIVE, GEAR; PULLEY; other articles in machine design

Felver, Prof. Richard Irving *Designer, Carnegie Institute of Technology.* PRODUCT DESIGN; PRODUCTION ENGINEERING

Ferguson, Dr Edward, Jr. *Head, Department of Biology, Lincoln University* PLATYCOPA, articles on related taxonomic groups

Frey, Prof David G *Department of Zoology, Indiana University* FRESH-WATER ECOSYSTEM.

Fried, Dr Sherman *Staff Member, Lawrence Radiation Laboratory, University of California* AMERICIUM; NEPTUNIUM; RHENIUM; other articles on chemical elements

Friedman, Harold Leo. *Research Chemist, International Business Machines Research Center* WATER

Fries, Dr Erik F. B *Associate Professor of Biology, City College of New York* CHROMATOPHORE

Fritz, Dr Sigmund *U.S. Weather Bureau* INSOLATION; METEOROLOGICAL USE OF SATELLITES

Frondel, Prof Clifford *Department of Mineralogy, Harvard University* GARNET, RADIOACTIVE MINERALS, SILICATE MINERALS, articles on related minerals

Fry, Francis John. *Associate Professor of Electrical Engineering, University of Illinois* BIOLOGICAL EFFECTS OF SOUND WAVES (in part)

Fry, Prof Frederick Ernest Joseph *Department of Zoology, University of Toronto, Canada.* RESPIRATORY SYSTEM (in part).

Fry, Prof W J *Research Professor, Head, Biophysical Research Laboratory, University of Illinois* BIOLOGICAL EFFECTS OF SOUND WAVES (in part)

Fulks, Joe Robert *U.S. Weather Bureau.* ATMOSPHERIC ADIABATIC CHANGE, FOG; PRECIPITATION (METEOROLOGY), other articles in meteorology

Fuller, Prof Dudley D *Department of Mechanical Engineering, Columbia University* BEARINGS, ANTIFRICTIONAL.

Fuller, Prof Harry James. *Professor of Botany, University of Illinois* CHLOROPHYTA, EUGLENOPHYTA.

Fung, Dr Yuan-cheng B *Professor of Engineering, California Institute of Technology* AEROELASTICITY, FLUTTER, AERONAUTICAL.

Furnish, Prof William M *Professor and Chairman, Department of Geology, State University of Iowa* CEPHALOPODA FOSSILS (in part)

Furnival, Dr George M *Yale University School of Forestry* FOREST MENSURATION

Fuson, Prof R C *Department of Chemistry, University of Illinois* VINYLOGY

G

Galloway, Prof Jesse J *Professor emeritus of Geology and Paleontology, Indiana University* STROMATOPOROIDEA

Galloway, Dr William J *Bolt, Beranek and Newman, Inc* AIRCRAFT NOISE, NOISE CONTROL (in part), MUFFLER, other articles in acoustics

Gardiner, Dr John L *Animal Disease & Parasite Research Division, U.S Department of Agriculture* SPIRUROIDEA

Gardiner, Dr William Cecil *Manager, Electrochemicals Section, Development Department, Chemicals Division, Olin Mathieson Chemical Corporation* NITROGEN FIXATION

Gardner, Dr Frank Easter *Horticulturist, Agricultural Research Service, U S Department of Agriculture* GRAPEFRUIT, LEMON, ORANGE, other articles on fruits.

Gardner, Prof Victor Ray *Professor (retired) of Pomology, Rutgers University* AGRICULTURAL SCIENCE, PLANT.

Garman, Dr Philip *Connecticut Agricultural Experiment Station* ODONATA

Garrett, Prof Alfred B *Department of Chemistry, Ohio State University* CHEMISTRY, ELEMENTS (CHEMICAL), SALT (CHEMICAL)

Garrett, Dr Frederic Daugherty *Department of Anatomy, University of Miami School of Medicine* THYMUS GLAND

Ford, Dr. Richard. *Department of Legal Medicine, Harvard University* FORENSIC MEDICINE

Forster, Dr. Robert E. *Department of Physiology, Graduate School of Medicine, University of Pennsylvania.* RESPIRATION.

Forsythe, Dr. Richard H. *Head, Department of Poultry Husbandry, Iowa State University.* EGG PROCESSING; FOOD MANUFACTURING (in part).

Fortune, Dr. W B *Executive Director of Control, Eli Lilly and Company.* PHARMACEUTICALS TESTING.

Foster, Prof Jackson W. *Professor of Bacteriology, University of Texas.* BACTERIAL METABOLISM (in part), BACTERIAL PHYSIOLOGY; articles on microbiological methods and on fermentation of organic acids

Fox, Dr. Irving *School of Tropical Medicine, University of Puerto Rico* SIPHONAPTERA

Frame, Prof J Sutherland. *Professor of Mathematics, Michigan State University* ANGLE, GEOMETRY, EUCLIDEAN, SURFACE AND SOLID OF REVOLUTION; other articles in mathematics

Frank, Prof. Bernard *Professor of Watershed Management, Colorado State University* WATER CONSERVATION

Frank, Dr Peter W *Associate Professor of Biology, University of Oregon* SPECIES POPULATION

Franklin, Prof Philip *Professor of Mathematics, Massachusetts Institute of Technology* SERIES

Franks, Russell Minor *Marketing Research Division, Union Carbide Metals Company* IRON ALLOYS (in part)

Frary, Dr Francis Cowles *Consulting Engineer, Alcoa Research Laboratories* ALUMINUM

Frear, Dr Donald E H *Department of Agricultural Biochemistry, Pennsylvania State University* FUMIGANT

Frebold, Dr Prof Hans *Senior Research Paleontologist, Geological Survey of Canada* JURASSIC

Freedman, Dr Daniel X *Department of Psychiatry, Director of Psychopharmacology Laboratory, Yale School of Medicine* PSYCHIC ENERGIZER, PSYCHOPHARMACOLOGIC DRUGS, PSYCHOTOMIMETIC DRUG, TRANQUILIZER

Freedman, Steven Irwin *Instructor, Mechanical Engineering Department, Massachusetts Institute of Technology* ISENTROPIC FLOW (in part)

Freeman, Prof Ralph Leslie *Professor of Mechanical Engineering, Iowa State University* CASTING, ROLLING, METAL, SHEET METAL FORMING, other articles on metal working

Freeman, Reino S *Research Fellow and Associate Professor, University of Toronto, Canada* CYCLOPHYLLIDEA, articles on related taxonomic groups.

Freeman, Ronald A *Supervising Airport Engineer with Seelye, Stevenson, Value, and Knecht, Consulting Engineers, New York* AIRPORT ENGINEERING, RUNWAY, AIRPORT

Freiser, Dr Henry. *Professor of Chemistry, University of Arizona* EXTRACTION (in part)

Fremed, Raymond F *Associate Editor, 'Chemical Engineering'* HEAT EXCHANGER

French, Dr David W *Associate Professor, Department of Plant Pathology and Botany, University of Minnesota* TREE (in part), WOOD DECAY.

Fretter, Prof William B *Department of Physics, University of California* CLOUD CHAMBER; GEIGER-MÜLLER COUNTER; IONIZATION CHAMBER; articles on particle detectors

Freundt, Dr E A *Statens Seruminstitut, Copenhagen, Denmark.* BACTEROIDACEAE; MYCOPLASMATALES

Gigg, Dr Roy *Chemistry Division, National Institute for Medical Research, London, England.* LIPID; other articles on lipids.

Gilbert, Dr. Edgar N *Research Mathematician, Bell Telephone Laboratories, Inc.* INFORMATION THEORY.

Giletti, Prof Bruno John *Department of Geology, Brown University* OCEAN CURRENTS (in part).

Gilliland, Prof. Edwin R *Department of Chemical Engineering, Massachusetts Institute of Technology* DISTILLATION.

Gingrich, Prof Newell S *Professor of Physics, University of Missouri* MECHANICS, CLASSICAL.

Ginzton, Prof Edward Leonard. *Stanford University* AMPLITUDE-MODULATION DETECTOR; AMPLITUDE MODULATOR, other articles on modulators and detectors

Gish, Oliver Holmes *Assistant Director (retired) of Department Terrestrial Magnetism, Carnegie Institute of Washington.* ELECTROJET, UPPER AIR, TERRESTRIAL ELECTRICITY.

Gittings, William Norton *Standards Development and Training Course Specialist, General Electric Company* FUSE, ELECTRIC, SWITCH, ELECTRIC, related articles on electrical components.

Glasford, Prof Glenn M *Professor of Electrical Engineering, Syracuse University* MULTIVIBRATOR, SAW-TOOTH WAVE, TIME-DELAY CIRCUITS, other articles on electronic circuits.

Glass, Prof Bentley *Professor of Biology, Johns Hopkins University* HUMAN GENETICS (in part)

Glicksman, Dr Richard *Semiconductor and Materials Division, Radio Corporation of America* ELECTRODE POTENTIAL.

Glock, Dr Waldo S *Professor and Chairman, Tree-Ring Research Laboratory and Department of Geology, MacAlester College* DENDROCHRONOLOGY, TREE-RING HYDROLOGY

Gluckstern, Robert L. *Associate Professor of Physics, Yale University* RELATIVISTIC ELECTRODYNAMICS

Goddard, Prof David R *Division of Biology, University of Pennsylvania* PLANT FERMENTATION

Goddu, Dr Robert Fenno *Senior Research Chemist, Hercules Powder Company* FLUORIMETRIC ANALYSIS, POLARIMETRIC ANALYSIS, SPECTROPHOTOMETRIC ANALYSIS, other articles on chemical analysis

Godman, Robert R *Assistant Division Chief, Propulsion Aerodynamics Division, National Aeronautics and Space Administration, Lewis Research Center, Cleveland.* WIND TUNNEL INSTRUMENTATION

Goebel, Prof Charles J *Department of Physics and Astronomy, University of Rochester* ELEMENTARY PARTICLE, PARITY (QUANTUM MECHANICS), SYMMETRY LAWS (PHYSICS), other articles on elementary particles

Goetzel, Dr Claus G *College of Engineering, New York University* POWDER METALLURGY

Goland, Leonard *Vice-President, Research and Development, Kellett Aircraft Corporation* AUTOGIRO

Goldberg, Prof Edward David. *University of California at La Jolla* HYDROSPHERE, HYDROSPHERE, GEOCHEMISTRY OF, SEA WATER (in part)

Goldblith, Prof Samuel Abraham *Acting Head, Department of Food Technology and Professor of Food Technology, Massachusetts Institute of Technology* FOOD ENGINEERING (in part)

Goldich, Dr Samuel S *U.S. Geological Survey* BAUXITE; LATERITE

Gonser, Dr Bruce W *Battelle Memorial Institute, Columbus* METAL COATINGS (in part), TIN ALLOYS, TIN METALLURGY

Good, Dr. Irving John *Deputy Chief Scientific Officer, Admiralty Research Laboratory, Middlesex, England* MONTE CARLO METHOD

Gaudin, Prof. Antoine M *Massachusetts Institute of Technology.* FLOTATION.

Gaylord, Prof. Charles N. *Chairman, Department of Civil Engineering, University of Virginia* ARCH; BRIDGE (in part); CIVIL ENGINEERING, other articles in civil engineering.

Gaylord, W. M., Jr. *National Carbon Company, Division of Union Carbide Corporation* GRAPHITE (in part).

Geldard, Prof. Frank Arthur. *Professor of Psychology and Chairman of Department of Psychology, University of Virginia* PAIN, CUTANEOUS; TEMPERATURE SENSES; TOUCH; other articles on somesthesis.

Gemmill, Arthur Vernon *Senior Associate Editor, 'Food Engineering,' McGraw-Hill Publishing Company.* FOOD ENGINEERING (in part).

Gensemer, Prof Maxwell *Howe Professor of Metallurgy, Columbia University.* METAL, MECHANICAL PROPERTIES OF.

Gensler, Prof. Walter J. *Department of Chemistry, Boston University.* HETEROCYCLIC COMPOUNDS, INDOLE; QUINOLINE; related articles

Gergel, Max G *Columbia Organic Chemicals Company* FREON, HALOFORM REACTION (in part), HALOGENATED HYDROCARBON (in part)

Gerjuoy, Dr Edward *John Jay Hopkins Laboratory for Pure and Applied Science, General Atomic Division of General Dynamics Corporation* QUANTUM MECHANICS, QUANTUM THEORY, NONRELATIVISTIC, QUANTUM THEORY, RELATIVISTIC, other articles in quantum physics

Gerlach, Dr Arch C. *Chief, Map Division and Chair of Geography, Library of Congress* GLOBE, TERRESTRIAL.

Germer, Dr Lester H *Research Physicist, Bell Telephone Laboratories, Inc* ELECTRON DIFFRACTION (in part)

Gersh, Prof Isidore. *Department of Anatomy, University of Chicago.* BLOOD (in part), CONNECTIVE TISSUE; EPITHELIUM, HISTOLOGY.

Gershoff, Dr. Stanley Norton. *Department of Nutrition, Harvard School of Public Health* VITAMIN, series of articles on individual vitamins.

Gertsch, Dr Willis John *Curator, Department of Entomology, American Museum of Natural History, New York* AMBLYPYGI, PALPIGRADI, PEDIPALPI, UROPYGI

Gerwe, Dr Elmer G *Head, Biological Control Laboratories, Eli Lilly and Company* BIOASSAY (in part)

Giarman, Prof Nicholas J *Professor of Pharmacology, Yale University School of Medicine* CHEMOTHERAPY, series of articles on synthetic antibacterial agents

Gibbons-Fly, Walter *Technical Advisor, Cinerama, Inc* CINEMATOGRAPHY

Gibson, Dr James J *Professor of Psychology, Cornell University* PERCEPTION

Gibson, Dr. John Egan *Professor of Electrical Engineering, Purdue University.* ELECTROMAGNET, MAGNET WIRE, MAGNETIC CIRCUITS, SOLENOID (ELECTRICAL)

Gibson, Dr. T *Lecturer in Bacteriology, School of Agriculture, Edinburgh, Scotland.* BACILLACEA

Giedt, Prof Warren H *Department of Mechanical Engineering, University of California* CONDUCTION (HEAT)—in part; CONVECTION (HEAT).

Giese, Prof. Arthur Charles. *Department of Biological Sciences, Stanford University.* INFRARED RADIATION (BIOLOGY), ULTRAVIOLET RADIATION (BIOLOGY).

Greenfield, Robert Edman *Vice-President, Manufacturing (retired), A. E. Staley Manufacturing Company* SOYBEAN (in part).

Greensfelder, Dr Bernard S. *Director of Oil Research, Shell Development Company* AROMATIZATION, CRACKING; DEPOLYMERIZATION.

Greenspan, Martin *National Bureau of Standards.* DAMPING; FORCED OSCILLATION, IMPEDANCE, MECHANICAL, LISSAJOUS FIGURES

Greenstein, Prof Jesse L *Mount Wilson and Palomar Observatories, California Institute of Technology* MAGNITUDE, STELLAR, STAR, series of articles on various stars

Greep, Dr Roy Orval *Dean and Professor of Anatomy, Harvard School of Dental Medicine* DIGESTIVE SYSTEM (in part).

Gregg, Prof James L *Professor of Metallurgical Engineering, Cornell University* ALLOY, HEAT-TREATMENT (METALS AND ALLOYS)—in part

Gregory, Dr Alfred Thorne *Consulting Engineer* AIRCRAFT ENGINE PERFORMANCE

Gregory, Prof Joseph T *Associate Professor and Curator of Vertebrate Paleontology, Peabody Museum, Yale University* CROCODILIA FOSSILS, DINOSAUR, articles on related fossil groups

Grey, Dr David S *Polaroid Corporation* MICROSCOPE, REFLECTING (in part)

Griffin, Dr Donald R *Professor of Zoology, Harvard University* MIGRATORY BEHAVIOR

Griggs, Prof David T *Institute of Geophysics, University of California* ROCK MECHANICS

Grim, Dr Ralph E *Department of Geology, University of Illinois* CLAY, CLAY MINERALS, articles on related minerals (all co-authored)

Grinstead, Dr Robert R *Project Leader, Research Department, Dow Chemical Company* IODINE (in part)

Grobstein, Prof Clifford *Department of Biological Sciences, Stanford University* ANIMAL MORPHOGENESIS

Groggins, Philip Herkimer *Senior Scientific Advisor, Chemical Division Food Machinery and Chemical Corporation* AMINATION, HYDROGENATION HYDROLYTIC PROCESSES, articles on other unit processes

Gross, Prof Paul Randolph *Associate Professor of Biology, New York University* CELL ORGANIZATION

Gross, William H *Dow Metal Products Company, Division of Dow Chemical Company* MAGNESIUM

Groves, Dr Gordon W *Instituto de Geofisica, Universidad Nacional de Mexico* TIDE

Gruen, Dr Dieter M *Argonne National Laboratory* MAGNETOCHEMISTRY

Grundfest, Prof Harry *Professor of Neurology, College of Physicians and Surgeons, Columbia University* ELECTRIC ORGAN (BIOLOGY), EPHAPTIC TRANSMISSION SYNAPTIC TRANSMISSION

Grüneberg, Prof Hans *Professor of Genetics, University of London* EXPRESSIVITY, GENE, PENETRANCE, GENE, PLEIOTROPISM

Guirard, Dr Beverly Marie *Department of Biochemistry, University of California* BIOASSAY (in part)

Guise, Prof Cedric Hay, *Professor emeritus of Forestry, Cornell University* FORESTRY, FARM

Gulbransen, Dr Earl Alfred *Westinghouse Research Laboratories* CORROSION (in part)

Gunckel, Prof James E *Department of Botany, Rutgers University* BUDDING, GRAFTING OF PLANTS, STEM (BOTANY)—in part, STEM CUTTINGS

Goodall, Prof. McChesney, Jr *Assistant Director of Research, University of Tennessee Memorial Research Center and Hospital* AVIATION MEDICINE, DECOMPRESSION ILLNESS; SPACE BIOLOGY; WEIGHTLESSNESS

Goodchild, Dr. Chauncey G. *Professor of Biology, Chairman of Department, Emory University* PLATYHELMINTHES.

Goodheart, Prof Clarence Francis *Chairman, Department of Electrical Engineering, Union College.* CIRCUIT, ELECTRIC, OPEN CIRCUIT; PARALLEL CIRCUIT, POTENTIOMETER (VARIABLE RESISTOR).

Goodman, Bernard. *Associate Professor of Physics, University of Missouri.* FIELD THEORY, CLASSICAL, FRAME OF REFERENCE, STATICS IN SPACE, other articles in classical mechanics

Goodnight, Dr Clarence James *Department of Biological Sciences, Purdue University* PHALANGIDA

Goody, Prof Richard Mead *Harvard University* AIR GLOW, ATMOSPHERE, related articles in meteorology

Gordon, Dr Isabella *Crustacea Section, British Museum of Natural History, London, England* MALACOSTRACA, articles on related taxonomic groups

Gordon, Prof Louis *Department of Chemistry and Chemical Engineering, Case Institute of Technology* FLOCCULATION, PRECIPITATION (CHEMISTRY), SUPERSATURATION, VOLATILIZATION

Gordon, Dr Saul *Staff Specialist for Chemistry, Pyrotechnics Laboratory, Picatinny Arsenal* THERMOANALYSIS

Gordon, Dr William Edwin *Research Chemist, Arthur D Little, Inc, Cambridge, Massachusetts* EXPLOSION AND EXPLOSIVE, FIRE EXTINGUISHER, FLAME, series of related articles

Goss, Prof Harold *Professor of Animal Husbandry, University of California at Davis* ANIMAL-FEED COMPOSITION

Gossner, Mrs Simone Daro *Astronomer, U S Naval Observatory, Washington, D C* ECLIPSE, ASTRONOMICAL, OCCULTATION, TRANSIT (ASTRONOMY)

Gowen, Prof John W *Genetics Department, Iowa State University* SEX-INFLUENCED INHERITANCE

Graham, George K *National Broadcasting Company, New York* TELEVISION CAMERA, TELEVISION STUDIO

Grandelis, Doris Dida *'Petroleum Week'* PETROLEUM GEOLOGY

Granick, S *Associate Professor, The Rockefeller Institute* CHLOROPHYLL

Grau, Dr Frederick V *Agronomist, Consultant to Hercules* VETCH

Graumann, Dr Hugo O *Chief, Forage and Range Research Branch, Crops Research Division, Agricultural Research Service, U S Department of Agriculture* ALFALFA

Graves, Dr Arthur Harmount *Consultant in Genetics, Connecticut Agricultural Experiment Station, Curator emeritus, Brooklyn Botanic Gardens* TREE (in part), series of articles on various trees

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Greenberg, Prof David M *Department of Biochemistry, University of California School of Medicine* PROTEIN METABOLISM

Greenblatt, Dr Robert Benjamin *Medical College of Georgia* GRANULOMA INGUINALE (in part)

Greenfield, Robert Edman *Vice-President, Manufacturing (retired), A. E. Staley Manufacturing Company* SOYBEAN (in part).

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Greenspan, Martin *National Bureau of Standards* DAMPING, FORCED OSCILLATION, IMPEDANCE, MECHANICAL; LISSAJOUS FIGURES

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Groves, Dr Gordon W *Instituto de Geofisica, Universidad Nacional de Mexico* TIDE

Gruen, Dr Dieter M. *Argonne National Laboratory* MAGNETOCHEMISTRY

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Gulbransen, Dr Earl Alfred *Westinghouse Research Laboratories* CORROSION (in part)

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Goodchild, Dr. Chauncey G *Professor of Biology, Chairman of Department, Emory University* PLATYHELMINTHES

Goodheart, Prof. Clarence Francis *Chairman, Department of Electrical Engineering, Union College* CIRCUIT, ELECTRIC; OPEN CIRCUIT, PARALLEL CIRCUIT, POTENTIOMETER (VARIABLE RESISTOR).

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Goodnight, Dr Clarence James *Department of Biological Sciences, Purdue University* PHALANGIDA.

Goody, Prof Richard Mead *Harvard University* AIR GLOW, ATMOSPHERE, related articles in meteorology

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Hamilton, Dr Edwin L. *U.S. Navy Electronics Laboratory, San Diego* OCEANIC ISLANDS, SEAMOUNT AND GUYOT (both in part).

Hamilton, Dr. Howard L. *Professor of Zoology, Iowa State University* COELOM, METAMERISM, EMBRYONIC; NEURULATION; PRIMITIVE GUT

Hammell, Dr Edward Frederic. *Group Leader, Los Alamos Scientific Laboratory* CRYOGENIC ENGINEERING; CRYOGENICS; LIQUEFACTION OF GASES; LOW-TEMPERATURE THERMOMETRY.

Hammond, Edwin Hughes *Associate Professor of Geography, University of Wisconsin* HILL AND MOUNTAIN TERRAIN, PLAINS, other articles on terrain areas

Hand, Dr Cadet. *Department of Zoology, University of California* COELENTERATA; CORALLIMORPHARIA, PTYCHODACTIARIA; RADIATA

Handler, Prof Philip *Department of Biochemistry, Duke University* NITROGEN EXCRETION

Hansen, Dr Arthur Gene. *Associate Professor of Mechanical Engineering, University of Michigan* DYNAMIC SIMILARITY; STREAMLINE FLOW, STREAMLINING (in part)

Hanson, Allen Louis *Associate Professor of Chemistry, St Olaf College, Minnesota* Series of articles on various topics in chemistry

Hanson, Frederick H *Research Associate, The Upjohn Company* ERYTHROMYCIN

Harary, Prof Frank *Department of Mathematics, University of Michigan* GRAPH THEORY

Hardgrove, Ralph M *Research Consultant, Babcock and Wilcox Company* CRUSHING AND PULVERIZING, FURNACE (STEAM GENERATING), other articles on mills and furnaces

Harding, Prof Clifford Vincent. *Assistant Professor of Physiology, College of Physicians and Surgeons, Columbia University* PROTOPLASM (in part)

Harding, Dr John Philip *Principal Scientific Officer, British Museum of Natural History, London* CLADOCERA

Harford, Edward Frederick. *Chemical Engineer, Industrial and Biochemicals Department, E I du Pont de Nemours and Company* ANTIFREEZE MIXTURE

Hargis, Dr William J, Jr *Laboratory Director and Professor of Marine Science, Virginia Fisheries Laboratory and The College of William and Mary* ASPIDOGASTREA, MONOGENEA; TREMATODA

Harker, Dr Robert Ian. *Research Petrologist, Johns-Manville Research Center, New Jersey* CALCITE; other articles on carbonate minerals

Harleman, Dr Donald Robert F. *Associate Professor of Hydraulics, Massachusetts Institute of Technology* HYDRAULIC ANALOG TABLE, RIPPLE TANK, WAVE MOTION IN LIQUIDS, other articles in hydraulics

Harned, Roger Lee *Research Microbiologist, Commercial Solvents Corporation* CYCLOSERINE

Harrar, Dr J George. *Vice-President, The Rockefeller Foundation* BANANA, PLANT DISEASE CONTROL (both in part)

Harris, Dr Cyril Manton [illegible] *tics research), Departme*[illegible] *University* ABSORPTION [illegible] NOISE CONTROL IN BUIL[illegible]

Harris, Dr Forest K. *National Bureau of Standards.* CURRENT BALANCE; GALVANOMETER (in part)

Harris, Dr Harry *Reader in Biochemical Genetics, University of London, England* HUMAN GENETICS (in part)

Harrison, Dr George R *Dean, School of Science, Massachusetts Institute of Technology* DIFFRACTION GRATING

Gunkler, Dr. Albert Arthur *Director Bromine Research, Dow Chemical Company.* BROMINE, HALOGEN ELEMENTS

Gurney, Dr. Ashley B. *Entomology Research Division, U.S. Department of Agriculture* PSOCOPTERA, ZORAPTERA

Guy, Raymond F *Senior Staff Engineer, National Broadcasting Company.* RADIO; TELEVISION; related articles on radio and television.

H

Haddock, Prof. Fred T *Department of Astronomy and Department of Electrical Engineering, University of Michigan.* RADIO ASTRONOMY; RADIO TELESCOPE

Hader, Rodney N *Editor, 'Journal of Agricultural and Food Chemistry,' American Chemical Society.* AGRICULTURAL CHEMISTRY.

Hadler, Jacques B. *Head, Ship Powering Division, David Taylor Model Basin, Washington, D C.* TOWING TANK

Hadley, Dr Elbert Hamilton *Professor of Chemistry, Southern Illinois University* Series of articles in organic chemistry

Hadorn, Prof. Dr Ernst. *Professor of Zoology and Comparative Anatomy, University of Zürich, Switzerland* GENE ACTION (in part).

Haensel, Dr. Vladimir *Director of Process Research Department, Universal Oil Products Company* REFORMING (PETROLEUM REFINING)

Hagen, Dr John Peter *Director, Office for United Nations Conferences, National Aeronautics and Space Administration* BALLISTICS, EXTERIOR, SATELLITE, ARTIFICIAL, SPACE STATION, other articles in engineering and physics

Hagner, Dr Arthur F *Professor of Geology, University of Illinois* ORE AND MINERAL DEPOSITS

Hahn, Dr John F *Associate Professor of Psychology, University of Virginia* PSYCHOPHYSICAL METHODS, SENSATION

Haines, John Elliott *Vice-President, Minneapolis-Honeywell Regulator Company* HUMIDISTAT

Hainsworth, Bruce D *Assistant to Director of Research, The Foxboro Company* PRESSURE MEASUREMENT, VACUUM MEASUREMENT, other articles on pressure and vacuum instrumentation

Hales, Dr Milton Reynolds *Assistant Professor of Pathology, Yale University School of Medicine* GALLBLADDER DISORDERS, GASTROINTESTINAL TRACT DISORDERS, LIVER DISORDERS, PANCREAS DISORDERS

Haley, Prof Leanor Davison *Assistant Professor, Department of Microbiology, Yale University, Director, Microbiology Laboratories, Yale—New Haven Medical Center* MYCOLOGY, MEDICAL, other articles on mycotic infections

Hall, Dr Carl William. *Department of Agricultural Engineering, Michigan State University* AGRICULTURAL SOIL AND CROP PRACTICES (in part)

Hall, Dr. Edmund K *Professor of Anatomy, School of Medicine, University of Louisville* EAR

Hall, Dr Richard P *Professor of Biology, New York University* PROTOZOA, articles on related taxonomic groups

Halpern, Dr J *Associate Professor of Chemistry, University of British Columbia* GOLD METALLURGY, SILVER METALLURGY

Halvorson, Dr Harlyn O *Department of Bacteriology, University of Wisconsin.* BACTERIAL ENDOSPORES

Halvorson, Prof H Orin *Director, School of Life Sciences, University of Illinois* FOOD PRESERVATION

Hamer, Dr. Walter J *Chief, Electrochemistry Section, National Bureau of Standards* ELECTROMOTIVE FORCE (CELLS), other articles in electrochemistry

Haynes, David Oliphant *Consulting Industrial Engineer* BULK-HANDLING MACHINES, CONVEYING MACHINES; INDUSTRIAL TRUCKS, other articles in industrial engineering

Haynes, Dr William Clarence. *Principal Bacteriologist, A R S Culture Collection, Northern Utilization Research and Development Division, U.S Department of Agriculture* PSEUDOMONADACEAE, PSEUDOMONADALES, PSEUDOMONADINEAE.

Hazen, Prof David C. *Forrestal Research Center, Princeton University* AIRPLANE, KITE

Hazen, Richard *Partner, Hazen and Sawyer, New York.* RESERVOIR, WATER SUPPLY ENGINEERING, WATER TREATMENT

Hazen, Ronald McKean *Consultant* AIRCRAFT ENGINE, AIRCRAFT ENGINE, RECIPROCATING

Hearmon, R F S *Officer-In-Charge, Physics Section, Forest Products Research Laboratory, England* ANELASTICITY, ELASTICITY, PLASTICITY

Hecht, Prof Hans H *Department of Medicine, University of Utah College of Medicine* ELECTROCARDIOGRAPHY, ELECTROPHYSIOLOGY (HEART), PHONOCARDIOGRAPHY, VECTORCARDIOGRAPHY

Hedberg, Dr Hollis D *Department of Geology, Princeton University* PROSPECTING, PETROLEUM (in part)

Hedgpeth, Prof Joel W *College of the Pacific, Pacific Marine Station, Dillon Beach, California* PALAEOISOPUS, PYCNOGONIDA

Heezen, Dr Bruce C *Lamont Geological Observatory, Columbia University* MARINE SEDIMENTS, OCEAN CURRENTS, SUBMARINE TOPOGRAPHY (all in part) TURBIDITY CURRENT

Heidt, Prof Lawrence J *Department of Chemistry, Massachusetts Institute of Technology* PHOTOCHEMISTRY

Heilbrunn, Dr L V *Department of Zoology, University of Pennsylvania* CENTRIFUGATION

Heimsch, Dr Charles *Professor and Chairman, Department of Botany, Miami University* ROOT (BOTANY)—in part

Heinrich, Prof E William *Mineralogical Laboratory, University of Michigan* MICA, PETROLOGY, ROCK, series of related articles

Heiskanen, Dr Weikko A *Institute of Geodesy, Ohio State University, Finnish Geodetic Institute, Helsinki, Finland* GEODESY, POLAR WANDERING, TERRESTRIAL FORCE FIELDS, TERRESTRIAL GRAVITATION

Hela, Prof Ilmo *Director, Institute of Marine Research, Finland* BALTIC SEA

Helmers, Dr Carl J *Assistant Manager, Process Development Division, Research and Development Department, Phillips Petroleum Company* CARBON BLACK

Henderson, Edward P *Associate Curator Division of Mineralogy and Petrology, U S National Museum, Smithsonian Institution* METEORITE, TEKTITE

Hendrickson, Prof H M *Department of Mechanical Engineering, University of Washington* DRY ICE, REFRIGERATION, REFRIGERATOR, series of related articles

Henke, Prof Burton L *Physics Department, Pomona College, California* MICRORADIOGRAPHY (in part)

Henny, Keith *McGraw-Hill Book Company* CIRCUIT, ELECTRONIC (in part), ELECTRONICS

Henry, Dr Dora Priaulx *Research Associate Professor, Department of Oceanography, University of Washington* CIRRIPEDIA, articles on related taxonomic groups

Herb, Prof Raymond G *Department of Physics, University of Wisconsin* COCKCROFT-WALTON ACCELERATOR, RESONANCE TRANSFORMER, VAN DE GRAAFF GENERATOR

Harrison, Henry Turner *Director of Meteorology, United Air Lines Operating Base, Stapleton Airfield, Denver* AEROLOGY, AERONAUTICAL METEOROLOGY

Harrison, Louis P *Chief, Technical Investigations, U. S. Weather Bureau* AIR PRESSURE, ATMOSPHERIC HIGH, ATMOSPHERIC LOW, ISOBAR

Harrow, Dr Benjamin *Formerly, Department of Chemistry, College of City of New York* DISEASE (in part).

Harsh, M Duffield *Engineering Leader, Electron Tube Division, Radio Corporation of America* CATHODE-RAY TUBE; STORAGE TUBE

Harsha, Wayne V *Editor, 'The Inland and American Printer and Lithographer'* COMPOSITION (TYPE)

Hart, Dr Helen *Department of Plant Pathology and Botany, University of Minnesota* PLANT DISEASE CONTROL (in part)

Hart, Dr. Jackson Sanford *Head, Animal Physiology Section, Division of Applied Biology, National Research Council, Canada* THERMOREGULATION

Hartman, Dr Olga *Allan Hancock Foundation, University of Southern California* ANNELIDA, ARCHIANNELIDA, POLYCHAETA

Hartman, Dr Willard D *Associate Professor of Zoology, Curator of Invertebrate Zoology, Peabody Museum of Natural History, Yale University* PORIFERA, articles on related taxonomic groups

Hartsuch, Prof Bruce Edwin *Associate Professor emeritus of Chemistry, Michigan State University* BLEACHING

Hartung, Dr Walter H *Professor of Pharmaceutical Chemistry, Medical College of Virginia* PHARMACEUTICAL CHEMISTRY

Harvey, Dr E Newton *Henry Fairfield Osborn Professor of Biology, Princeton University* BIOLUMINESCENCE, MICROSCOPE, CENTRIFUGE

Hasche, Dr R L *Hasche Engineering Company, Johnson City, Tennessee* FUEL GAS SUPPLEMENTS

Haskins, Dr Reginald H *Head, Physiology and Biochemistry of Fungi Section, National Research Council, Prairie Regional Laboratory, Canada* INDUSTRIAL MICROBIOLOGY

Hass, Dr Henry Bohn *President, Sugar Research Foundation* SUGAR

Hassialis, Dr Menelaos Dimitri *Krumb Professor of Mining and Executive Officer of The Henry Krumb School of Mines, Columbia University* ORE DRESSING

Hassid, Prof William Z *Department of Biochemistry, Biochemistry and Virus Laboratory, University of California* CARBOHYDRATE, series of articles on carbohydrates

Hatai, Dr Prof Kotora *Professor of Historical Geology, Institute of Geology and Paleontology, Faculty of Science, Tohoku University, Japan* BRACHIOPODA, articles on related taxonomic groups

Hauf, Dean Harold D *School of Architecture, Rensselaer Polytechnic Institute* ARCHITECTURAL ENGINEERING

Hausman, Dr Eugene Arnold *Research Chemist, Engelhard Industries, Inc* IRIDIUM, OSMIUM, PLATINUM

Hausner, Henry H *Consulting Engineer* INTERMETALLIC COMPOUNDS, CERMET

Havighorst, Carl Rousseau *Senior Associate Editor, 'Food Engineering'* FOOD ENGINEERING (in part)

Hawkins, Dr Arthur *Professor of Agronomy, University of Connecticut* POTATO, IRISH (in part)

Hawkins, George Andrew *Dean of Engineering Purdue University* HEAT BALANCE, THERMODYNAMIC PRINCIPLES series of related articles

Haynes, David Oliphant. *Consulting Industrial Engineer* BULK-HANDLING MACHINES; CONVEYING MACHINES; INDUSTRIAL TRUCKS; other articles in industrial engineering

Haynes, Dr William Clarence. *Principal Bacteriologist, ARS Culture Collection, Northern Utilization Research and Development Division, U.S. Department of Agriculture* PSEUDOMONADACEAE; PSEUDOMONADALES; PSEUDOMONADINEAE.

Hazen, Prof. David C. *Forrestal Research Center, Princeton University* AIRPLANE; KITE

Hazen, Richard *Partner, Hazen and Sawyer, New York.* RESERVOIR; WATER SUPPLY ENGINEERING; WATER TREATMENT

Hazen, Ronald McKean. *Consultant.* AIRCRAFT ENGINE, AIRCRAFT ENGINE, RECIPROCATING.

Hearmon, R. F. S. *Officer-In-Charge, Physics Section, Forest Products Research Laboratory, England* ANELASTICITY; ELASTICITY; PLASTICITY

Hecht, Prof Hans H. *Department of Medicine, University of Utah College of Medicine* ELECTROCARDIOGRAPHY; ELECTROPHYSIOLOGY (HEART), PHONOCARDIOGRAPHY, VECTORCARDIOGRAPHY

Hedberg, Dr Hollis D *Department of Geology, Princeton University* PROSPECTING, PETROLEUM (in part)

Hedgpeth, Prof Joel W *College of the Pacific, Pacific Marine Station, Dillon Beach, California* PALAEOISOPUS, PYCNOGONIDS

Heezen, Dr Bruce C *Lamont Geological Observatory, Columbia University* MARINE SEDIMENTS, OCEAN CURRENTS, SUBMARINE TOPOGRAPHY (all in part), TURBIDITY CURRENT.

Heidt, Prof Lawrence J *Department of Chemistry, Massachusetts Institute of Technology* PHOTOCHEMISTRY

Heilbrunn, Dr L. V *Department of Zoology, University of Pennsylvania* CENTRIFUGATION.

Heimsch, Dr Charles *Professor and Chairman, Department of Botany, Miami University* ROOT (BOTANY)—in part

Heinrich, Prof E. William *Mineralogical Laboratory, University of Michigan* MICA, PETROLOGY, ROCK, series of related articles

Heiskanen, Dr Weikko A *Institute of Geodesy, Ohio State University, Finnish Geodetic Institute, Helsinki, Finland* GEODESY, POLAR WANDERING, TERRESTRIAL FORCE FIELDS, TERRESTRIAL GRAVITATION

Hela, Prof Ilmo *Director, Institute of Marine Research, Finland* BALTIC SEA

Helmers, Dr Carl J *Assistant Manager, Process Development Division, Research and Development Department, Phillips Petroleum Company* CARBON BLACK

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Hendrickson, Prof H M *Department of Mechanical Engineering, University of Washington* DRY ICE, REFRIGERATION, REFRIGERATOR; series of related articles

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Henny, Keith *McGraw-Hill Book Company* CIRCUIT, ELECTRONIC (in part). ELECTRONICS

Henry, Dr Dora Priaulx *Research Associate Professor, Department of Oceanography, University of Washington* CIRRIPEDIA, articles on related taxonomic groups

Herb, Prof Raymond G *Department of Physics, University of Wisconsin* COCKCROFT-WALTON ACCELERATOR, RESONANCE TRANSFORMER, VAN DE GRAAFF GENERATOR

Herrmann, Dr. H. *Department of Pediatrics, University of Colorado Medical School* CELL (BIOLOGICAL)—in part.

Hershey, Dr John Brackett. *Woods Hole Oceanographic Institution.* SCATTERING LAYER.

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Hertz, Prof Carl S *Associate Professor of Mathematics, Cornell University.* FOURIER SERIES AND INTEGRALS, ORTHOGONAL POLYNOMIALS

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Hewins, Edward Foster. *Engineering Technical Department (retired), Newport News Shipbuilding and Dry Dock Company* MARINE MACHINERY (in part).

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Heywood, Dr. Donald Lee. *Research Chemist, Union Carbide Chemicals Company* POLYOXYETHYLATION OF ALCOHOL

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Hicks, Tyler G *Editor, Industrial and Engineering Books, McGraw-Hill Book Company, Inc* ADHESIVE, COMPRESSOR

Hildebrand, Dr Joel *Department of Chemistry, University of California* PHYSICAL SCIENCE, SOLUTION

Hilgard, Dr Ernest R *Department of Psychology, Stanford University* LEARNING THEORIES

Hill, Dr Armin J *Dean, College of Physical and Engineering Sciences, Brigham Young University* PROJECTION SYSTEMS, OPTICAL

Hill, Prof E L *Professor of Physics, School of Physics, University of Minnesota* INERTIA OF ENERGY, LORENTZ TRANSFORMATIONS RELATIVISTIC MECHANICS, related articles in physics

Hill, Dr. Howard Rice *Los Angeles County Museum (retired)* CEPHALOBAENIDA, PENTASTOMIDA, POROCEPHALIDA

Hill, Dr Rolla Bennett, Jr *Assistant Pathologist, Bridgeport Hospital; Clinical Instructor, Department of Pathology, Yale University School of Medicine* JAUNDICE, PIGMENTATION

Hindman, Dr James C *Senior Chemist, Argonne National Laboratory* PLUTONIUM

Hirschfelder, Dr Joseph Oakland *Professor of Chemistry, University of Wisconsin* GAS (in part)

Hoagland, Dr Hudson *Executive Director, Worcester Foundation for Experimental Biology* STRESS (PSYCHOLOGICAL).

Hobbs, Dr Herman Hedberg *Associate Professor of Physics, George Washington University* CRYSTAL

Hobbs, Dr. Lindsey M *Assistant Director, Chemical Research and Engineering, Central Research Laboratory, Air Reduction Company, Inc.* POLYMER PROPERTIES, POLYMERIZATION; other articles on polymers (all in part)

Hobby, Dr. Gladys L. *Director, Veterans Administration Special Research Laboratory, Veterans Administration Hospital, East Orange, New Jersey* ANTIBIOTIC; VIOMYCIN

Hoch, Fred W. *President, Fred W. Hoch Associates, Inc., Graphic Arts Methods and Management Consultant* PRINTING PRESS

Hocking, Prof. Brian *Department of Entomology, University of Alberta, Canada* FLIGHT

Hochwalt, Dr. Carroll Alonzo *Vice-President, Monsanto Chemical Company* INSECTICIDE, MITICIDE; PESTICIDE (all in part)

Hodges, George H. *Manager, Marine Department, Babcock and Wilcox Company* MARINE BOILER

Hoekstra, Dr. Henry R. *Associate Chemist, Argonne National Laboratory* URANIUM.

Hoff, Professor C. Clayton *Department of Biology, University of New Mexico.* PSEUDOSCORPIONIDA; RICINULEI, SOLPUGIDA.

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Hoffmann, Dr. Friedrich Wilhelm *Chemical Corps, Chemical Warfare Laboratories, Army Chemical Center, Maryland* ORGANOARSENIC COMPOUND; ORGANOPHOSPHORUS COMPOUND.

Hogan, Dr. C. Lester *General Manager, Semiconductor Products Division, Motorola, Inc.* FERRIMAGNETIC GARNETS, FERRITE DEVICES, GYRATOR, VARISTOR

Hogg, Helen Sawyer *Professor of Astronomy, University of Toronto, Research Associate, David Dunlap Observatory, Canada* STAR CLOUDS, STAR CLUSTERS, HYADES, PLEIADES

Holland, Prof. Heinrich Dieter *Department of Geology, Princeton University* LITHOSPHERE, LITHOSPHERE, GEOCHEMISTRY OF

Hollinshead, Prof. W. Henry *Professor of Anatomy, Mayo Foundation, University of Minnesota; Head of Section of Anatomy, Mayo Clinic* AORTIC BODY, CAROTID BODY

Hollowell, Dr. Eugene A. *Crops Research Division, A.R.S., U.S. Department of Agriculture* CLOVER (in part)

Holt, Dr. Perry C. *Associate Professor of Zoology, Department of Biology, Virginia Polytechnic Institute* OLIGOCHAETA.

Holthuis, Dr. Lipke B. *Curator, Division of Crustacea, Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands* HOPLOCARIDA, STOMATOPODA

Hood, Prof. George J. *Professor emeritus of Engineering Drawing, University of Kansas* DESCRIPTIVE GEOMETRY

Hoover, John Edgar *Director, Federal Bureau of Investigation* FINGERPRINT

Horsfall, Dr. James G. *Director, Connecticut Agricultural Experiment Station* FUNGISTAT AND FUNGICIDE (in part)

Hörstadius, Prof. Sven *Professor of Zoology, University of Uppsala, Sweden* NEURAL CREST

Hotchkiss, Grosvenor *Coordinating Engineer, Western Union Telegraph Company* TELEGRAPHY (in part), TELEX

Hough, Richard R. *Vice-President, Ohio Bell Telephone Company* TELEPHONE SERVICE (in part); TELEVISION NETWORKS

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Howard, Dr. Walter E *Specialist in Vertebrate Ecology, University of California* RODENTICIDE

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Howell, Dr Benjamin F, Jr *Head, Department of Geophysics and Geochemistry, Pennsylvania State University* EARTH; GEOPHYSICS (in part).

Howells, Dr T. A. *Senior Research Associate, Institute of Paper Chemistry* FLAMEPROOFING

Howells, Prof W. W *Peabody Museum, Harvard University* ANTHROPOLOGY, PHYSICAL, FOSSIL MAN, other articles on forms of fossil man

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Hughes, Prof Vernon Willard *Physics Department, Yale University* POSITRONIUM

Hukill, Dr Peter Biggs *Instructor in Pathology, Yale University School of Medicine* LEUKEMIA, LEUKOPENIA

Hulbary, Dr Robert L *Professor of Botany, University of Iowa* COLLENCHYMA, PARENCHYMA

Hulbert, Walter C *Head, Planting and Fertilizing Equipment and Practices Investigations, A R S, U S Department of Agriculture* FERTILIZING (in part)

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Hunter, Eugene M *Manager, General Engineering, Electric Utility Engineering Section, General Electric Company* LIGHTNING AND SURGE PROTECTION, LIGHTNING ARRESTER LIGHTNING ROD

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Hyde, Dr Earl K *Lawrence Radiation Laboratory, University of California* ASTATINE; FRANCIUM; RADON

Hyman, Dr Herbert H *Senior Chemist, Argonne National Laboratory.* SOLVENT.

Hynes, Lee Powers *Consulting Engineer* HEATING, ELECTRIC.

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Isbin, Prof Herbert S *Department of Chemical Engineering, University of Minnesota* REACTOR, NUCLEAR (CLASSIFICATION)

Itano, Dr Harvey Akio *National Institutes of Health* HEMOGLOBIN

J

Jacobs, Dr Woodrow C *Director of Climatology, U.S Air Force, Headquarters Air Weather Service, Scott Air Force Base, Illinois* AGRICULTURAL METEOROLOGY (in part), CLIMATIC CHANGE; CONTINENTALITY, WEATHER AND CLIMATE, OCEAN-METEOROLOGICAL RELATIONS

Jacobson, A Walter *Assistant Chief Engineer, Bristol Company* RECORDING INSTRUMENTS, GRAPHIC

Jacobson, Prof Nathan *Yale University* RING THEORY

Jakobi, Dr Prof Hans *Professor of Animal Physiology, University of Parana, Brazil* ANASPIDACEA, BATHYNELLACEA, EUMALACOSTRACA SYNCARIDA

James, Dr Arthur Montague *Reader in Physical Chemistry, Department of Chemistry, Chelsea College of Science and Technology, London, England* CELL-SURFACE IONIZATION

James, Gideon T *Museum of Paleontology, University of California* CETACEA FOSSILS, HYDRACOIDEA FOSSILS, articles on related fossil groups

James, John William *Vice-President, Research, McDonnell and Miller Inc* STEAM HEATING

James, Robert Sloan *Chief, Branch of Electrical-Mechanical Testing, U.S Bureau of Mines.* MINING OPERATING FACILITIES (in part)

Jen, Dr C K *Physicist, Applied Physics Laboratory, Johns Hopkins University* CAVITY RESONATOR; MICROWAVE, MICROWAVE OPTICS WAVE GUIDE

Jenkins, David S *Former Director, Office of Saline Water, U.S Department of the Interior;* Consulting Engineer SALINE WATER RECLAMATION

Jenkins, Prof Francis Arthur *Department of Physics, University of California* ATOMIC STRUCTURE AND SPECTRA, DIFFRACTION, ZEEMAN EFFECT (in part), articles in atomic physics and physical optics

Jensen, Dr Hans Laurits *Head of Department of Bacteriology, State Laboratory for Soil and Crop Research, Lyngby, Denmark* AZOTOBACTERACEAE, CORYNEBACTERIACEAE, MYCOBACTERIACEAE

Jette, Dr Eric *Staff Consultant, Research Administration Department, Union Carbide Corporation* METALLURGY

Joesting, Dr. Henry R. *Staff Geophysicist, U S Geological Survey* PROSPECTING

Johnson, David S *Acting Chief, Meteorological Satellite Section, U S Weather Bureau* METEOROLOGICAL ROCKETS.

Johnson, Prof Frank Harris *Professor of Biology, Princeton University* CELL (PRESSURE-TEMPERATURE EFFECTS).

Johnson, George Brooks *Assistant Chief Engineer, Newport News Shipbuilding and Dry Dock Company* MARINE MACHINERY (in part)

Johnson, Dr Howard W *Agricultural Research Service, U.S Department of Agriculture, Mississippi Agricultural Experiment Station, Delta Branch Experiment Station* SOYBEAN (in part).

Johnson, Dr. Iver J. *Research Director, Caladino Farm Seeds, Inc.* GRAIN CROPS; articles on major grains (co-authored).

Johnson, Dr J Harlan *Professor emeritus of Geology, Colorado School of Mines.* ALGAE FOSSILS, articles on related fossil groups.

Johnson, K W *President, K W Johnson and Company, Inc, Chemical Engineer* DYNAMICAL ANALOGIES; SHOCK ISOLATION, articles on vibration.

Johnson, Kenneth A. *Assistant Professor of Physics, Department of Physics and Laboratory of Nuclear Science, Massachusetts Institute of Technology* QUANTUM ELECTRODYNAMICS, QUANTUM FIELD THEORY.

Johnson, Dr Martin W *Scripps Institution of Oceanography, University of California* CALANOIDA, COPEPODA

Johnson, Dr Richard A *Associate Professor of Electrical Engineering, Syracuse University* FILTER, ELECTRIC (in part)

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Jones, Dr Daniel J *Professor of Geology, University of Utah* MICROPALEONTOLOGY, PROTISTA, articles on related fossil groups

Jones, Dr E Ruffin *Professor of Biology, University of Florida* TURBELLARIA, articles on related taxonomic groups

Jones, Dr Norman Sumner. *Senior Lecturer, Marine Biological Station, University of Liverpool, England* CUMACEA

Joseph, Prof Thomas Leonard *University of Minnesota School of Mines and Metallurgy* IRON (EXTRACTION FROM ORE)

Jost, Prof Alfred *Laboratory of Comparative Physiology, Faculty of Sciences, University of Paris* REPRODUCTIVE SYSTEM (in part)

Judd, Dr Deane Brewster *Photometry and Colorimetry Section, National Bureau of Standards* COLORIMETRY, FILTER, COLOR

Judd, William R *Staff Consultant on Geotechnics and Arctic Logistics, The RAND Corporation* ENGINEERING GEOLOGY (in part).

Judson, Prof. Sheldon *Associate Professor of Geology, Princeton University* FALL LINE, FLUVIAL EROSION LANDFORMS

Just, Dr Theodore *Chicago Natural History Museum.* FLOWER (BOTANY)—in part

Juve, Arthur E *Director Technical Services Research, B F. Goodrich Research Center* RUBBER PRODUCTS

Kagan, Dr. Jerome *Chairman, Department of Psychology, Fels Research Institute.* BEHAVIOR, ONTOGENY OF (in part).

Källén, Dr Bengt A J *Department of Embryology, University of Lund, Sweden* NERVOUS SYSTEM (in part)

Kallmann, Dr Franz J *Professor of Psychiatry, Columbia University, Chief of Psychiatric Research (Medical Genetics), New York State Psychiatric Institute* HUMAN GENETICS (in part).

Känzig, Dr Werner *General Electric Research Laboratory* BARIUM TITANATE, FERROELECTRICS; PIEZOELECTRICITY, PYROELECTRICITY

Kaplan, Prof Joseph *Department of Physics, University of California.* GEOPHYSICS (in part)

Kaplan, Dr Lewis David *Department of Meteorology, Massachusetts Institute of Technology* GREENHOUSE EFFECT, TERRESTRIAL, HEAT BALANCE, TERRESTRIAL ATMOSPHERIC, RADIATION, TERRESTRIAL (in part).

Kaplan, Dr Louis *Senior Chemist, Argonne National Laboratory* HYDROGEN, TRITIUM

Kappus, Peter G *Flight Propulsion Division, General Electric Company* TURBOFAN, TURBOPROP

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Keen, Dr A Myra. *Assistant Professor of Paleontology and Curator of Malacology, Stanford University* PELECYPODA FOSSILS

Keffer, Prof Frederic *Professor of Physics, University of Pittsburgh* FERROMAGNETISM, PARAMAGNETISM (both in part), other articles in magnetism (co-authored)

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Kempf, Norman W *Chocolate Manufacturing Consultant, Walter Baker Division, General Foods Corporation.* COCOA POWDER AND CHOCOLATE

Kendeigh, Dr S Charles *University of Illinois* BIOME, COMMUNITY

Kennedy, Dr Donald *Department of Biological Sciences, Stanford University* PHOTORECEPTION (in part).

Kennedy, Prof Ralph Craig *Adjunct Professor of Electrical Engineering, New York University; Development Engineer, National Broadcasting Company* TELEVISION SCANNING.

Kensler, Prof Charles J *Chairman, Department of Pharmacology and Experimental Therapeutics, Boston University School of Medicine* PHARMACOLOGY

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Kerr, S Logan *Consulting Engineer* WATER HAMMER

Kerr, Dr William J *University of California Hospital (retired)* SYMBALLOPHONE.

Kesling, Prof Robert Vernon *Professor of Geology and Curator of Micropaleontology, University of Michigan* MYODOCOPA (in part), OSTRACODA (in part), PALEOCOPA, PODOCOPA (in part)

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Kilpatrick, Prof Martin *Illinois Institute of Technology* SCANDIUM

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King, Dr Donald West. *Yale University School of Medicine* MALNUTRITION, METABOLIC DISORDERS

King, Prof Thomas B *Massachusetts Institute of Technology. Department of Metallurgy* VACUUM METALLURGY

King, Dr. Thomas Henry *Department of Plant Pathology and Botany, University of Minnesota* PEA, STRAWBERRY (both in part)

Kingery, Donald Samuel *Director, Health and Safety Research and Testing Center, U.S Bureau of Mines* MINING OPERATING FACILITIES (in part)

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Kinnier, Prof Henry Lee *University of Virginia* COMPOSITE BEAM

Kinsler, Prof. Lawrence Edward *Professor of Physics, U.S Naval Postgraduate School* RESONANCE (ACOUSTICS AND MECHANICS), TUNING FORK, VIBRATION, VIBRATION PICKUP.

Kinsman, Blair. *Chesapeake Bay Institute, Johns Hopkins University* RIVER TIDES, TIDAL BORE

Kiplinger, Prof D C *Horticulture and Forestry Department, Ohio State University* FLORICULTURE.

Kirby, Dr Kenneth W. *Research Chemist, Penick and Ford, Ltd., Inc* PECTIN (in part).

Kirkpatrick, Dr Sidney Dale. *Consulting Editor, Chemical Engineering Series, McGraw-Hill Book Company* CHEMICAL ENGINEERING

Kirschner, Prof Stanley *Department of Chemistry, Wayne State University, Michigan* SELENIUM, SULFUR; TELLURIUM.

Kirshenbaum, Dr Isidor *Research Associate, Esso Research and Engineering Company* HEAVY WATER

Klarmann, Dr Emil G *Vice-President and Director of Technical Services, Lehn and Fink, Inc., Lecturer, Department of Dermatology and Syphilology, New York University* BIOASSAY (in part)

Klass, Philip J *Avionics Editor, 'Aviation Week'.* ELECTRONIC COUNTERMEASURES, MOLECULAR ELECTRONICS, PASSIVE RADAR

Klein, Prof David H *Assistant Professor of Chemistry, Los Angeles State College* NUCLEATION (in part)

Klemens, Dr Paul Gustav *Westinghouse Research Laboratories, Pittsburgh* CONDUCTION (HEAT)—in part, UMKLAPP PROCESS

Klick, Dr Clifford Coover *Head, Luminescence Section, U S Naval Research Laboratory* ELECTROLUMINESCENCE, LUMINESCENCE, other articles on luminescence and in theoretical physics (all co-authored)

Klieger, Paul *Manager, Field Research Section, Research and Development Laboratory, Portland Cement Association* CONCRETE

Kline, Dr Hibberd Van Buren, Jr *Professor and Chairman, Department of Geography, University of Pittsburgh* AFRICA

Klock, Dr Harold Francis *Electrical Engineering Department, Case Institute of Technology* AMPLIFIER, DISTORTION (ELECTRONIC CIRCUITS), FEEDBACK CIRCUIT, other articles on electronic circuits

Knappen, Dr Russell S *Vice-President, Foster Associates, Inc.* OIL AND GAS FIELD DEVELOPMENT, PETROLEUM ENGINEERING

Knauss, Dr John A *Scripps Institution of Oceanography, University of California* OCEAN CURRENTS (in part)

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Knebelman, Prof Morris S *Professor of Mathematics, Washington State University* COORDINATE SYSTEMS, GRAPHICAL, GEOMETRY, DIFFERENTIAL

Knight, Dr C Arthur *Professor of Virology and Research Biochemist, Virus Laboratory, University of California* VIRUS

Knight, Dr Samuel Bradley *Professor of Chemistry, University of North Carolina.* HYDROGEN ION (in part)

Knoerr, Alvin W. *Editor, 'Engineering and Mining Journal'* METAL AND MINING PROCESSING

Knopf, Dr Eleanora Bliss *Research Associate, School of Mineral Sciences, Stanford University* CLEAVAGE, ROCK, PETROFABRIC ANALYSIS; SCHISTOSITY, ROCK, STRUCTURAL PETROLOGY

Knowles, Hugh S. *Director of Research, Industrial Research Products, Inc.* LOUDSPEAKER.

Knowlton, P. Holland *Large Steam Turbine Generator Department, General Electric Company.* STEAM TURBINE; TURBINE.

Koch, Leonard J. *Deputy Director, Reactor Engineering Division, Argonne National Laboratory.* ELECTROMAGNETIC PUMPS; REACTOR, NUCLEAR

Kochendorfer, Fred D. *Head, Planetary Flight Systems, National Aeronautics and Space Administration* NOZZLE.

Koczy, Prof Friedrich. *Professor of Marine Sciences, The Marine Laboratory, University of Miami.* OCEANOGRAPHY (in part).

Koerker, Frederick William. *Technical Expert, The Dow Chemical Company* CHLORINE

Kohl, Arthur L. *Chief Chemical Engineer, Research Division, The FLUOR Corporation, Ltd* HUMIDIFICATION, STRIPPING.

Kohls, Glen M. *Sanitarian Director, U.S Public Health Service, Rocky Mountain Laboratory, Montana* IXODIDES.

Komai, Dr. Taku *Professor emeritus, Kyoto University, Japan* CTENOPHORA; articles on related taxonomic groups

Konigsbert, Dr Irwin R *University of Colorado School of Medicine* PANCREAS (in part)

Konzo, Prof Seichi *Mechanical Engineering Department, University of Illinois* REGISTER, AIR, WARM AIR HEATING SYSTEM

Kopac, Prof M J *Department of Biology, New York University* MICROMANIPULATION.

Kopal, Prof. Zdeněk *Head, Department of Astronomy, University of Manchester, England* BINARY STARS

Kornemann, Henry C *Assistant Manager, Engineering Laboratory, Linde Company* ATMOSPHERIC GASES, PRODUCTION OF

Kott, Dr Maurice G *Director, Division of Mental Retardation, Department Institutions and Agencies, State of New Jersey* CRETINISM, MENTAL DEFICIENCY, MONGOLIAN IDIOCY, PHENYLPYRUVIC OLIGOPHRENIA

Kotter, Dr F Ralph *Physicist, National Bureau of Standards* CAPACITANCE BOX, CAPACITANCE MEASUREMENT

Kraehenbuehl, Prof John Otto *Professor emeritus of Engineering, University of Illinois* ARC LAMP, INCANDESCENT LAMP, INFRARED LAMP, PHOTOFLASH LAMP

Krause, Lloyd N *Aeronautical Research Scientist, Instruments, National Aeronautics and Space Administration, Lewis Research Center* PITOT TUBE

Krefeld, Prof William J *Professor of Civil Engineering, Columbia University* LOADING, TRANSVERSE, STRESS AND STRAIN, STRUCTURAL CONNECTIONS, other articles in civil engineering

Kreitlow, Dr Kermit William *Principal Plant Pathologist, Crops Research Division, A R.S , U S Department of Agriculture, Beltsville, Maryland.* CLOVER, GRASS CROPS (both in part)

Kret, David B *Project Engineer, Semiconductor Division, Motorola, Inc* PHOTOELECTRIC DEVICES

Krishna, Kumar *Department of Zoology, University of Chicago* SOCIAL INSECTS

Krombein, Dr Karl V. *Insect Identification and Parasite Introduction Branch, Entomology Research Division, U.S Department of Agriculture.* HYMENOPTERA.

Krumbein, Dr. William C *Department of Geology, Northwestern University.* FACIES (GEOLOGY)

Krusen, Dr Frank Hammond. *Senior Consultant, Section of Physical Medicine and Rehabilitation, The Mayo Clinic* THERMOTHERAPY (in part).

Krynine, Prof Dimitri P. *Consultant.* ENGINEERING GEOLOGY (in part)

Kryter, Dr Karl D *Research Psychologist, Bolt, Beranek and Newman, Inc* EAR PROTECTORS; NOISE CONTROL (in part), PHON; other articles in acoustics

Kuhn, Dr. Wayne E. *Texaco, Inc* DEWAXING (PETROLEUM); WAX, PETROLEUM.

Kuiper, Prof. Gerard P. *Director, Yerkes Observatory, University of Chicago* APOGEE, MOON; PERIGEE, PHASE (ASTRONOMY).

Kullas, Albert J *Manager of Technical Development, The Martin Company* WING STRUCTURE.

Kullerud, Dr Gunnar *Geochemist, Geophysical Laboratory, Carnegie Institution of Washington* SULFIDE PHASE EQUILIBRIA.

Kulp, Dr J Laurence *Professor of Geochemistry, Columbia University* COSMOCHEMISTRY, GEOCHEMISTRY; GEOCHRONOMETRY, GEOLOGICAL TIME SCALE, ROCK (AGE DETERMINATION)

Kummel, Prof Bernhard *Museum of Comparative Zoology, Harvard University* TRIASSIC.

Kunin, Dr Robert *Rohm and Haas Company* ION-PERMEABLE MEMBRANE (in part)

Kunkel, Prof Henry G *The Rockefeller Institute* BLOOD (in part)

Kunz, Dr Kaiser S *Research Professor of Electrical Engineering, New Mexico State University* CURVE FITTING, EXTRAPOLATION, GRAPHIC METHODS, INTERPOLATION

Kupchan, Prof S. Morris *Associate Professor of Pharmaceutical Chemistry, University of Wisconsin* ALKALOID, articles on various alkaloids

Kurtz, Stewart S, Jr *Sun Oil Company* OIL ANALYSIS

Kusch, Prof Polykarp *Department of Physics, Columbia University* ELECTRON SPIN, MOLECULAR BEAMS, other articles in atomic and molecular physics

L

Lackey, Prof James B *Professor of Sanitary Science, Department of Civil Engineering, University of Florida* MASTIGOPHORA, articles on related taxonomic groups.

Ladd, Dr Harry S *U.S Geological Survey* ATOLL, PALEOECOLOGY

Lagler, Prof Karl Frank *Department of Fisheries, University of Michigan* FISHERIES CONSERVATION

Lamanna, Dr Carl *Scientific Director, Naval Biological Laboratory, University of California* ANTIBACTERIAL AGENTS (in part)

Lamar, John E *Geologist, Illinois State Geological Survey* SAND

Landauer, Dr Walter *Professor of Genetics, University of Connecticut* PHENOCOPIES

Landes, Dr Hugh Stevenson *Assistant Professor of Electrical Engineering, University of Virginia* RECIPROCITY, PRINCIPLE OF

Landshoff, Dr. Rolf K. M *Lockheed Missiles and Space Division* COSMIC ELECTRODYNAMICS; MAGNETOHYDRODYNAMICS

Landweber, Prof Louis. *Professor of Mechanics and Hydraulics, State University of Iowa* HYDRODYNAMICS, HYDROKINEMATICS, HYDROKINETICS

Lane, James Arthur *Oak Ridge National Laboratory* NUCLEAR FUELS, NUCLEAR POWER

Lang, Dr Prof Karl G. H *Director of the Department of Invertebrates, Swedish State Museum of Natural History, Stockholm* HARPACTICOIDA; TANAIDACEA.

Langley, Dr Leroy Lester. *Professor of Physiology, University of Alabama Medical Center* DIGESTIVE SYSTEM (in part)

Lankton, Clark S, Jr. *Aircraft Nuclear Propulsion Department, General Electric Company* NUCLEAR AIRCRAFT PROPULSION (in part)

Lapedes, Daniel N. *Life Sciences Editor, McGraw-Hill Encyclopedia of Science and Technology* INFECTION; PATHOGEN, articles on several enzymes

Lapidus, Prof Leon *Department of Chemical Engineering, Princeton University.* CHEMICAL PROCESS CONTROL

Laport, Edmund Abner. *Director, Communications Engineering, Radio Corporation of America* AMPLITUDE-MODULATION RADIO, FREQUENCY-MODULATION RADIO

Lapple, Charles E *Senior Scientist, Stanford Research Institute* DUST AND MIST COLLECTION, PARTICLE PROPERTIES.

Larsen, Prof. Edwin Merritt. *Department of Chemistry, University of Wisconsin* INDIUM, NIOBIUM, TANTALUM, THALLIUM

Larsen, Dr. Helge *Professor of Biochemistry, The Technical University of Norway* BRINE, MICROBIOLOGY OF

Larsen, Dr Robert Gordon *Manager and Director of Research, Thornton Research Centre, Shell Research, Ltd, Chester, England.* LUBRICANT

Lass, Dr. Harry *Research Specialist Jet Propulsion Laboratory, California Institute of Technology* CALCULUS OF TENSORS, CALCULUS OF VECTORS

Lauffer, Prof Max A *Professor of Biophysics, Dean of the Division of Natural Sciences, University of Pittsburgh* BIOPHYSICS

Laves, Prof Dr Fritz Henning *Eidgenoessisch Technische Hochschule und Universitaet Zuerich, Institut Fuer Kristallographie and Petrographie, Zurich, Switzerland* FELDSPAR, articles on related minerals

Lawler, Frank K *Editor-in-Chief, 'Food Engineering'* FOOD ENGINEERING, FOOD MANUFACTURING (both in part), FOOD TECHNOLOGY

Lawroski, Dr. Stephen *Director, Chemical Engineering Division, Argonne National Laboratory* NUCLEAR FUELS REPROCESSING. RADIOCHEMICAL LABORATORY

Lawther, Dr Harry Preston, Jr *General Engineering Department (retired), Southwestern Bell Telephone Company* CROSSTALK

Layzer, Prof David *Professor of Astronomy, Harvard University* COSMOGONY, COSMOLOGY, STELLAR EVOLUTION, other articles in astronomy

Lazarus, Prof David. *Professor of Physics, University of Illinois* DIFFUSION IN SOLIDS

Leadon, Dr Bernard M *Senior Staff Scientist, Convair* SKIN FRICTION

Ledingham, Dr George Aleck *Director, Prairie Regional Laboratory, Saskatoon, Canada* 2,3-BUTANEDIOL

Ledoux, Louis P *Ledoux and Company, New Jersey* ASSAYING (in part)

Lee, Sir Harold Eugene *Vice-President, The Bunker Hill Company* LEAD METALLURGY

Lee, L. K *Manager, Product Engineering Department, Space Technology Laboratories, Inc* PRINTED CIRCUIT

Lehmer, Prof Derrick Henry *University of California* NUMBER SYSTEMS

Lehninger, Dr A L *Johns Hopkins University School of Medicine* CELL (BIOLOGICAL)—in part.

Lehrman, Prof Daniel S *Institute of Animal Behavior, Rutgers University* REPRODUCTIVE BEHAVIOR

Lein, Dr Joseph. *Director, Microbiological Research, Assistant Director of Laboratories, Bristol Laboratories* KANAMYCIN

Lems, Dr Kornelius *Assistant Professor of Biological Sciences, Goucher College, Baltimore* ISLAND FAUNAS AND FLORAS, POPULATION DISPERSAL, SUCCESSION, ECOLOGICAL, other articles in ecology.

Leontis, Dr Thomas Ernest *The Dow Metal Products Company, Division of the Dow Chemical Company* MAGNESIUM ALLOYS

Leopold, Prof A. Carl *Professor of Physiology of Horticultural Crops, Purdue University* PLANT HORMONES

Leopold, Prof A Starker *University of California* BIOGEOGRAPHY

Leopold, Dr Luna Bergere *Chief Hydraulic Engineer, U S Geological Survey* STREAM GAGING, STREAM TRANSPORT AND DEPOSITION, SURFACE WATER, SWAMP, MARSH, AND BOG

LePage, Dr Wilbur R *Chairman, Department of Electrical Engineering, Syracuse University* CHOKE (FILTER), FILTER, ELECTRIC (in part), NOISE FILTER, RADIO, SUPPRESSOR

Lerch, William *Consultant, Portland Cement Association* AIR-ENTRAINING PORTLAND CEMENT, CEMENT, PORTLAND CEMENT

Lettau, Dr Heinz Helmut *Professor of Meteorology and Civil Engineering, University of Wisconsin* MICROMETEOROLOGY

Leva, Max *Consulting Chemical Engineer* GAS ABSORPTION OPERATIONS

Levasheff, V V *Inorganic Section Group Leader, American Potash and Chemical Corporation* BORON (in part)

Levine, Dr Philip *Director, Division of Immunohematology, Ortho Research Foundation, Raritan, New Jersey.* BLOOD GROUPS

Levitt, Dr I M *Director, The Fels Planetarium of the Franklin Institute* PLANETARIUM

Lewis, Dr Bernard *Combustion and Explosives Research, Inc* COMBUSTION

Lewis, Prof Edward B *Professor of Biology, California Institute of Technology* ALLELE, PSEUDOALLELES

Lewis, Frank D *Engineer, General Radio Company* FREQUENCY COUNTER, FREQUENCY MEASUREMENTS (in part), PIEZOELECTRIC CRYSTAL, WAVELENGTH MEASUREMENT

Lewis, Dr James C *Research Chemist, Western Regional Laboratory, U S Department of Agriculture* SUBTILIN

Lewis, Dr Willard Deming *Director of Research, Communications Systems, Bell Telephone Laboratories, Inc* SWITCHING THEORY

Ley, Dr h c Willy *Fairleigh Dickinson University* BALLISTICS, INTERIOR

Li, Dr C C *Professor of Biometry, Graduate School of Public Health, University of Pittsburgh* BIOMETRICS, HUMAN GENETICS (in part), POPULATION GENETICS

Li, Prof Choh Hao *Director, Hormone Research Laboratory, University of California* PANCREAS (in part), THYROID GLAND (in part), articles on various hormones

Libby, Prof Willard Frank *Formerly, member of Atomic Energy Commission, presently, Department of Chemistry, University of California* RADIOACTIVE FALLOUT

Liddicoat, Richard Thomas, Jr *Director, Gemological Institute of America* GEM, GEM CUTTING, series of articles on various gems

Liedholm, George Edward *Department Head, Oil Process Engineering, Shell Development Company* ISOMERIZATION

Lill, Gordon G *Office of Naval Research* MOHO (MOHOROVICIC DISCONTINUITY)

Liller, Dr William *Professor of Astronomy, Harvard University* COAL SACK, GALAXY, THE, INTERSTELLAR MATTER NEBULA

Limpel, Eugene J *Director, Electrical Research, A O. Smith Corporation.* FLASH WELDING; RESISTANCE WELDING; SPOT WELDING

Lin, Dr Shao-Chi *Principal Research Scientist, AVCO-Everett Research Laboratory* SHOCK WAVE, SONIC BARRIER; SONIC BOOM; WAVE MOTION IN FLUIDS.

Lindenmaier, Dr Werner A. *Manufacturing Chemist, Hoffmann-LaRoche, Inc* ASCORBIC ACID (in part)

Linder, Fil dr. Folke *Flickläroverket, Hälsingborg, Sweden* ANOSTRACA; BRANCHIOPODA; CONCHOSTRACA, NOTOSTRACA.

Linderoth, L Sigfred, Jr. *Director of Engineering, Central Research and Engineering Division, Continental Can Company, Inc.* FLYWHEEL; SPRING (MECHANICAL), WELDED JOINT; other articles in machine design.

Linford, Prof. Henry B. *Professor of Chemical Engineering, Columbia University.* ELECTROMETALLURGY.

Linsley, Prof E. Gorton *Department of Entomology and Parasitology, University of California.* ANIMAL SYSTEMATICS, SPECIES CONCEPT, TYPE METHOD, other articles in animal systematics

Lippert, Thomas W. *Director of Marketing, Titanium Metals Corporation of America* TITANIUM METALLURGY

Little, Elbert L, Jr *Dendrologist, U S Forest Service, U S Department of Agriculture* DENDROLOGY

Lobo, Walter E. *Consulting Chemical Engineer* TUBE-STILL HEATER.

Lochhead, Dr Allan Grant *Microbiology Research Institute, Canada Department of Agriculture* SOIL MICROBIOLOGY, SOIL MICROORGANISMS, other articles in soil microbiology

Lockhart, Dr Ernest E *Scientific Director, Coffee Brewing Institute* COFFEE (in part).

Lockwood, Dr Lewis B *Assistant Director, Biosynthesis Laboratory, Miles Chemical Company* ACETOBACTER SUBOXYDANS FERMENTATION, VINEGAR

Loewenstein, Dr Werner R *Associate Professor of Physiology, College of Physicians and Surgeons, Columbia University* *MECHANORECEPTORS*

Lohrie, Ben *President, Plasmakote Corporation* METAL COATINGS (in part).

Long, Prof Franklin A. *Department of Chemistry, Cornell University* ACID AND BASE

Longwell, Dr Chester Ray *Geologist, U S Geological Survey* DIASTROPHISM, GEOLOGY

Lord, Prof Richard C *Spectroscopy Laboratory, Massachusetts Institute of Technology* INFRARED RADIATION, INFRARED SPECTROSCOPY, RAMAN EFFECT, other articles in optics

Lorenz, Prof Edward N *Department of Meteorology, Massachusetts Institute of Technology* WEATHER (FORECASTING AND PREDICTION)—in part

Loughlin, James E *Manager, Technical Service, National Aniline Division, Allied Chemical Corporation* DYEING, TEXTILE PRINTING

Lovell, Wheeler G *Research and Development Department, Ethyl Corporation* ANTIKNOCK AGENTS

Lowan, Prof. Arnold N *Chairman, Physics Department, Yeshiva University, Brooklyn* e, EXPONENT, LOGARITHM, NUMERICAL ANALYSIS

Lowell, Prof. Wayne Russell *Department of Geology, Indiana University* Series of articles on apatite and pyromorphite minerals.

Lowenstam, Dr Heinz A *Geological Sciences, California Institute of Technology* PALEOECOLOGY (GEOCHEMICAL ASPECTS)

Lowenstein, Prof Otto Egon *Professor of Zoology and Comparative Physiology, The University, Birmingham, England* EQUILIBRIUM, BIOLOGICAL; TAXIS

Lowenthal, Dr David *Research Associate, American Geographical Society.* WEST INDIES.

Lucker, John Thomas *Animal Disease and Parasite Research Division, Agricultural Research Service, U.S. Department of Agriculture Parasitological Laboratory, Beltsville, Maryland* ASCARIDOIDEA; articles on related taxonomic groups

Ludlam, Dr Frank Henry. *Department of Meteorology, Imperial College, London, England* CLOUD

Ludvik, Dr George F. *Group Leader, Insecticide Application Research, Organic Chemicals Division, Monsanto Chemical Company* INSECTICIDE, MITICIDE (both in part).

Leubbers, Dr. Ralph H *Professor of Chemical Engineering, University of Missouri* HEAT TRANSFER.

Lundy, Clarence A *Office Engineer, Mechanical Department, New York Central Railroad System.* LOCOMOTIVE

Lush, Prof Jay L *Professor of Animal Husbandry, Iowa State University* BREEDING (ANIMAL).

Lush, Prof R H *Dairying, The University of Tennessee* CATTLE PRODUCTION, DAIRY

Luttrell, Dr E S *Head, Department of Plant Pathology, Georgia Experiment Station, University of Georgia* GRAPE CULTURE (in part)

Luzadder, Prof Warren J *Professor of Engineering Graphics, Purdue University* BOLT, NUT, SCREW THREADS, WASHER

Lyman, Dr Charles Peirson *Research Associate, Museum of Comparative Zoology and Harvard University Medical School* HIBERNATION (in part)

Lyman, Dr John *Oceanographer, National Science Foundation.* MEDITERRANEAN SEA, OCEANS AND SEAS, SEA, SEA WATER (in part)

Lynn, Dr John W *Research Group Leader, Union Carbide Chemicals Company* ALCOHOL, BUTANOL, METHANOL; PROPANOL

Lynn, Dr William Gardner. *Professor of Biology, The Catholic University of America* THYROID GLAND (in part)

Lyon, Dr Waldo K *Head, Submarine and Arctic Research Branch, U S Navy Electronics Laboratory* SEA ICE.

Lyons, Prof Walter *Manager, Station Facilities (Equipment and Systems Design), Radio Corporation of America Communications, Inc* RADIO RECEIVER, RADIO TRANSMITTER, series of related articles

M

Mabey, Charles A *Manager, Patent Department, The Bristol Company* WATTMETER

MacCarthy, Donnell D *Manager, Voltage Regulator Engineering, Voltage Regulator Product Section, General Electric Company* VOLTAGE REGULATOR (in part)

MacCoull, Neil *Lecturer in Mechanical Engineering, Columbia University* INTERNAL COMBUSTION ENGINE; series of related articles

Macdonald, Dr Gordon Andrew *Senior Professor of Geology and Geophysics, University of Hawaii, Volcanologist, Hawaii Institute of Geophysics* AMYGDULE, PUMICE; VOLCANO, VOLCANOLOGY

Macfadyen, Amyan *Lecturer in Zoology, University College of Swansea, Wales* BIOMASS; BIOLOGICAL PRODUCTIVITY, ECOLOGICAL SYSTEMS, ENERGY IN; FOOD CHAIN

MacInnes, Dr Duncan Artur. *The Rockefeller Institute.* ELECTROCHEMISTRY, ELECTROLYTIC CONDUCTANCE, TRANSFERENCE NUMBER

MacIntosh, Robert M *Manager, Tin Research Institute, Inc.* TIN

Mackey, Prof. George W *Professor of Mathematics, Harvard University.* OPERATOR THEORY.

Mackin, Prof. J. Hoover. *Department of Geology, University of Washington* GEOMORPHOLOGY.

MacNeille, Dr. Stephen Mann *Director of Research, American Optical Company.* OPTICAL FIBERS.

Maddock, Dr. Alfred Gavin *Cambridge University, England.* PROTACTINIUM

Mahler, Joseph *Research Physicist, American Optical Company Research Center.* VECTOGRAPH

Major, Dr Jack. *Department of Botany, University of California at Davis* PLANT COMMUNITY

Makulec, Alfred *Product Planning and Application Specialist, Large Lamp Department, General Electric Company* FLUORESCENT LAMP; PROJECTOR (LIGHT); articles on various types of lamps

Maldonado, Dr. José F. *Associate Professor of Parasitology, Puerto Rico School of Medicine, San Juan* Series of articles in medical parasitology.

Malone, Dr Thomas Francis *Director of Research, Travelers Insurance Company* INDUSTRIAL METEOROLOGY

Mamay, Dr. Sergius H *Paleobotanist, U.S. Geological Survey* COENOPTERIDALES, SPHENOPHYLLALES

Manchester, Prof. Curtis Alexander *University of Hawaii* EAST INDIES, PACIFIC ISLANDS.

Mann, Dr Kenneth Henry *Department of Zoology, University of Reading, Berkshire, England* ARHYNCHOBDELLAE, HIRUDINEA, RHYNCHOBDELLAE

Mann, Dr Robert Wellesley *Professor of Mechanical Engineering, Massachusetts Institute of Technology* ENVIRONMENTAL TEST, MINIATURIZATION OF EQUIPMENT, RELIABILITY OF EQUIPMENT, other articles in systems engineering

Manning, Dr Kenneth Verne *Associate Professor of Physics, Pennsylvania State University* INDUCTION, ELECTROMAGNETIC, MAGNETIC FIELD, articles in electromagnetism and magnetism

Manning, Dr Paul D V *Professor of Chemical Engineering, California Institute of Technology* MONOSODIUM GLUTAMATE

Manson, Dr John Alexander *Section Head, Central Research Laboratories, Air Reduction Company, Inc* POLYMER PROPERTIES, POLYMERIZATION, other articles on polymers (all in part)

Manuele, Joseph *Director of Quality Control, Westinghouse Electric Corporation, Pittsburgh* CONTROL CHART, INSPECTION AND TESTING, QUALITY CONTROL

Manuelidis, Elias E *Associate Professor of Pathology, Yale University School of Medicine* NERVOUS SYSTEM DISORDERS

Manwell, Prof Reginald Dickinson *Department of Zoology, Syracuse University* ACNIDOSPORIDEA, HAEMOSPORIDIIDA HAPLOSPORIDIA, SARCOSPORIDIA

Mapes, Charles M *Assistant Chief Engineer, American Telephone and Telegraph Company* TELEPHONE SERVICE (in part), TELEPHONY

Marcus, Prof Dr. Ernst *Department of Zoology, Faculty of Philosophy, University of São Paulo, Brazil* EUTARDIGRADA, HETEROTARDIGRADA, TARDIGRADA

Margenau, Prof. Henry *Yale University* INTERMOLECULAR FORCES; PROBABILITY IN PHYSICS

Marian, Dr. Joseph E *Forest Products Laboratory, University of California* WOOD FINISHING

Marinsky, Prof Jacob A *Professor of Chemistry, University of Buffalo* ION EXCHANGE

Markert, Prof. Clement L. *Department of Biology, Johns Hopkins University* EMBRYONIC DIFFERENTIATION

Markowitz, Dr. William *U.S. Naval Observatory.* EARTH (ORBITAL MOTION)—in part.

Markus, John *Technical Director, Dictionary Department, McGraw-Hill Book Company* Series of articles on electrical devices and electrical terminology.

Marsden, Dr Joan Rattenbury. *Department of Zoology, McGill University, Canada* PHORONIDA

Marshall, Dr Max S *University of California School of Medicine* BACTERIOLOGY, MEDICAL, CULTURE

Marshall, Norman Bertram *Principal Scientific Officer, British Museum of Natural History, London, England* DEEP-SEA FAUNA

Marshall, Dr Virgil Harrison *Doctor of Dental Surgery, Charlottesville, Virginia* DENTISTRY (in part)

Marshall, Prof William Robert *Professor of Chemical Engineering, University of Wisconsin* DRYING

Martin, Albert Frederick *Manager, Structural Adhesives Laboratory, 3M Company, Minnesota Mining and Manufacturing Company* ADHESIVE, STRUCTURAL

Martin, Dr Arthur Wesley. *Department of Zoology, University of Washington* EXCRETION

Martin, Dr Joseph Denegre *Medical Director, Louisiana Department of Public Welfare* ZOONOSES

Martin, Dr Weston J *Professor of Plant Pathology, Louisiana State University* POTATO, SWEET (in part)

Mason, Dr Basil John *Warren Research Fellow of The Royal Society, Imperial College of Science, London, England* CLOUD PHYSICS

Mason, Dr Warren Perry *Head, Mechanics Research, Bell Telephone Laboratories, Inc* INTERFEROMETER, ACOUSTIC, RADIOMETER, ACOUSTIC, ULTRASONICS.

Mason, Willard Franklin *Consulting Engineer, Mason Engineering Company, Inc* SLIP RINGS (in part)

Massey, Sir Harrie *Quain Professor of Physics and Head of Physics Department University College, London, England* SCATTERING EXPERIMENTS, ATOMIC AND MOLECULAR

Mather, Dr Kirtley F *Professor emeritus of Geology, Harvard University* CONTINENT, GEOGRAPHY, PHYSICAL

Maurer, Ted C *Agronomist, Soil Conservation Service, U.S Department of Agriculture* COVER CROPS

May, Frank H *Inorganic Section Head, American Potash and Chemical Corporation* BORON (in part).

May, James Edward *Associate Professor of Aeronautical Engineering, University of Virginia* INCOMPRESSIBLE FLOW, SUBSONIC FLIGHT

Mayall, (Mrs) Margaret Walton *Director, American Association of Variable Star Observers* MIRA, NOVA, SUPERNOVA, VARIABLE STAR

Mayall, Robert Newton *Director, Planning and Research Associates, Boston* SUNDIAL

Mayer, Ivan *Engineering Associate, Esso Research and Engineering Company* ALKYLATION

Mayer, Dr Rudolph L *Leonard Wood Memorial Hospital, Washington* SULFA DRUGS

Mayerson, Prof Hymen Samuel *Professor of Physiology and Chairman of Department, School of Medicine, Tulane University.* CARDIOVASCULAR SYSTEM (in part).

Maynard, Dr. Harold Bright. *President, Maynard Research Counselors, Inc ; Chairman of the Board, H. B Maynard and Company, Inc.* METHODS ENGINEERING; METHODS STUDY; WORK MEASUREMENT.

Mays, Rolland Lee. *Development Supervisor, Molecular Sieve Products, Linde Company, Division of Union Carbide Corporation* MOLECULAR SIEVE (in part).

Mazia, Prof. Daniel *Department of Zoology, University of California,* CELL DIVISION, CYTOKINESIS

McBee, Prof Earl T *Department of Chemistry, Purdue University.* HALOGENATION (in part).

McCabe, Dr Warren L. *Administration Dean, Polytechnic Institute of Brooklyn.* FILTRATION, LEACHING; SEPARATION (MECHANICAL); other articles on unit operations

McCann, (Miss) Mary B *Instructor, Department of Nutrition, Harvard School of Public Health* COENZYME; METABOLISM.

McClearn, Dr. Gerald Eugene *Department of Psychology, University of California* BEHAVIOR AND HEREDITY.

McCleary, Prof Robert A *Department of Psychology, University of Michigan.* BODY RHYTHM; HUNGER, SLEEP, other articles on body rhythms

McClellan, Leslie Newman *Consulting Engineer, Engineering Consultants, Inc , Denver, Colorado.* CANAL, DAM, PIPELINE

McClung, Dr Leland S *Professor of Bacteriology, Chairman of Department, Indiana University.* BLACKLEG, BOTULISM, GANGRENE, GAS, TETANUS.

McConnaughey, Dr. Bayard H *Department of Biology, University of Oregon* DICYEMIDA, MESOZOA, ORTHONECTIDA

McCormick, Dr Jack *In Charge of Vegetation Studies, The American Museum of Natural History, New York* TERRESTRIAL ECOSYSTEM, VEGETATION ZONES

McCormick, Dr J R D *Lederle Laboratories* DEMETHYLCHLORTETRACYCLINE

McCrea, Prof John F *Associate Professor of Biophysics, Yale University* HYALURONIDASE

McCrosky, Dr Richard Eugene *Lecturer in Astronomy, Harvard University* COMET, METEOR, ZODIACAL LIGHT, articles on individual comets

McCutcheon, Prof F Harold *Professor of Physiology, University of Pennsylvania* RESPIRATORY SYSTEM (in part)

McElroy, Dennis L *Executive Vice-President, Consolidation Coal Company* COAL MINING

McElroy, Prof William D *Chairman, Department of Biology, Johns Hopkins University* BACTERIAL LUMINESCENCE

McEwen, Prof Robert Stanley, *Professor emeritus, Oberlin College* RESPIRATORY SYSTEM (in part)

McFarland, Forest *Executive Assistant Chief Engineer, Buick Motor Division, General Motors Corporation* GEAR LOADING, OVERDRIVE; TRANSMISSION, AUTOMOTIVE, other articles in mechanical power.

McGrain, Preston *Assistant State Geologist, Kentucky Geological Survey, University of Kentucky* OIL-FIELD WATERS

McGraw, Dr. Leslie D *Assistant Chief, Electrochemical Engineering Division, Battelle Memorial Institute.* ELECTROCHEMICAL PROCESS (in part).

McKee, Rear Admiral (Retired) Andrew Irwin *Director of Research and Design, Electric Boat Division, Vice-President, General Dynamics Corporation.* SUBMARINE

McKenna, Dr. Malcolm C. *Assistant Curator of Fossil Mammals and Birds, American Museum of Natural History, Assistant Professor of Geology, Columbia University.* Dermoptera fossils; Insectivora fossils, articles on other fossil forms

McKenzie, Alexander Anderson. *Assistant Editorial Adviser, Technical Writing Service, McGraw-Hill Book Company.* Decca; Dectra; Hyperbolic navigation system; Loran.

McKetta, Dr John J *Graduate Professor and Chairman, Department of Chemical Engineering, University of Texas* Petroleum processing

McKusick, Dr Victor Almon *Professor of Medicine, Johns Hopkins University School of Medicine.* Human genetics (in part).

McLaughlin, Dr John Joseph A. *Haskins Laboratories, Saint Francis College, Brooklyn* Axenic culture

McLean, Dr Franklin C *Professor emeritus of Physiology, University of Chicago* Skeletal system (in part).

McMath, Prof Robert R. *Director, McMath-Hulbert Observatory, University of Michigan* Coronagraph; Spectrohelioscope; Telescope, astronomical.

McMillen, Wheeler *Vice-President, Farm Journal, Inc; Chairman of Board, The Chemurgic Council* Chemurgy.

McNitt, Capt Robert Waring *U.S Navy* Armament, naval.

McQuarrie, Dr Malcolm Caven *Ceramist, Patent Department, Kaiser Aluminum and Chemical Corporation* Ceramic technology, Glass and glass products, Refractory, series of related articles

McVittie, Prof. George C *Professor of Astronomy and Director of Observatory, University of Illinois* Space (in part)

Meese, Harry J *Head Engineer, Landing Ships, Craft and Boats, Bureau of Ships, U S Navy* Landing ships and craft.

Meggers, Dr William Frederick *National Bureau of Standards* Electron configuration (in part), Spectroscopy, Wavelength standards, other articles in spectroscopy

Meigs, Dr Peveril *Geographer, Protection Research Division, Quartermaster Research and Engineering Center* Environmental protection.

Meiklejohn, Dr Jane *Soil Microbiologist, Rothamsted Experimental Station, Harpenden, England* Methanomonadaceae, Nitrobacteriaceae, Soil mineral (microbial utilization), other articles on soil microbial cycles

Meinke, Prof William Wayne *Department of Chemistry, University of Michigan* Activation analysis, Radioisotope (assay); Radiometric assay

Meister, Prof Alton *Department of Biochemistry, Tufts University School of Medicine* Enzyme (in part)

Meixner, Prof Dr Josef. *Director, Institute Theoretical Physics, Aachen, Germany* Bessel functions, Beta function, Gamma function

Mellon, Prof M G *Department of Chemistry, Purdue University* Opaque medium; Translucent medium, Transparent medium

Mellors, Dr Robert Charles *Associate Director of Research, Director of Laboratories, Hospital for Special Surgery, New York* Microscope, fluorescence (in part)

Melnick, Prof Joseph L. *Chairman, Department of Virology and Epidemiology, Baylor University College of Medicine* Animal virus, series of articles on virus methodology and infections

Menard, Dr Henry W, Jr *Scripps Institution of Oceanography* Oceanic islands, Seamount and guyot (both in part)

Menzel, Prof Donald Howard. *Director, Harvard College Observatory* Astronomy, Flying saucers

Menzies, Dr Robert James *Research Associate, Biology Department, University of Southern California* ASELLOTA; ISOPODA

Mercanton, Dr Roger A *Hoffmann-LaRoche, Inc* BIOTIN (in part).

Merrill, Charles White. *Chief, Division of Minerals, Bureau of Mines, U S Department of Interior* MINING.

Merrill, Timothy W. *Director of Product Research, Vanadium Corporation of America* VANADIUM

Merritt, Frederick S. *Senior Editor, 'Engineering News-Record'* CONCRETE BEAM, PRESTRESSED CONCRETE; other articles on concrete usage

Mertle, Joseph S *Photomechanical Consultant, Minnesota Mining and Manufacturing Company* PRINTING PLATE (in part)

Meszar, John. *Director, Switching Systems Development, Bell Telephone Laboratories, Inc* COUNTING CIRCUIT, SWITCHING CIRCUIT

Meyer, Dr. Bernard S *Professor and Chairman, Department of Botany and Plant Pathology, Ohio State University* AUXIN, PLANT, WATER RELATIONS OF, PLANT PHYSIOLOGY

Meyer, Dr K F. *Director emeritus, George Williams Hooper Foundation, Professor emeritus of Experimental Pathology, University of California* LYMPHOGRANULOMA-PSITTACOSIS GROUP, PLAGUE, TULAREMIA, other articles on bacterial and viral diseases

Miczaika, Dr Gerhard R *Research Associate, Harvard College Observatory, Manager, Astrometry Department, Aeronutronic, a Division of Ford Motor Company* ASTRONOMICAL PHOTOGRAPHY, ASTRONOMICAL SPECTROSCOPY

Middlebrook, Dr Gardner *Director, Research and Laboratories, National Jewish Hospital, Denver* JOHNE'S DISEASE, LEPROSY, TUBERCULOSIS

Middleton, Prof John Tylor *Professor of Plant Pathology, University of California* CUCUMBER, SQUASH (both in part)

Miles, Thomas Kirk *Head, Bitumen Department, Shell Development Company* ASPHALT AND ASPHALTITE (in part)

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Miller, Prof Arthur K *Professor of Geology, State University of Iowa* CEPHALOPODA FOSSILS (in part)

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Miller, Dr Lawrence Ingram *Professor of Plant Pathology, Tidewater Research Station, Virginia Polytechnic Institute* PEANUT (in part)

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Moment, Prof Gairdner Bostwick *Goucher College* CELL CONSTANCY

Mommaerts, Prof Wilfried F H M. *Los Angeles County Heart Association Cardiovascular Research Laboratory, Department of Medicine, The University of California* MUSCLE (BIOPHYSICS)

Monod, Dr Theodore *Institut Francais d'Afrique Noire, Afrique Occidentale Francaise* GNATHIIDEA, PANCARIDA

Montgomery, Donald N *Senior Engineer, Aeronutronic, a Division of Ford Motor Company* ELECTROKINETIC TRANSDUCER

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Merrill, Charles White *Chief, Division of Minerals, Bureau of Mines, U.S. Department of Interior.* MINING

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Moore, Prof Raymond C. *Department of Geology, University of Kansas* CARBONIFEROUS; ECHINODERMATA FOSSILS, other articles on geologic divisions

Moore, Prof. Richard K. *Chairman, Electrical Engineering Department, University of New Mexico.* ALTIMETER, RADIO.

Moreno, Dr Theodore. *Vice-President, Tube Division, Varian Associates.* MICROWAVE TRANSMISSION LINES.

Morey, Dr. George W. *U S. Geological Survey* OPTICAL MATERIALS.

Morgan, Dr. Ann Haven *Mount Holyoke College.* EPHEMEROPTERA; PLECOPTERA

Morgan, Rear Admiral (Retired) Armand Malcolm *U S. Navy, Retired.* SHIP, NAVAL.

Morgan, Dr Clifford T. *Lecturer in Psychology, University of Wisconsin* PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL.

Morgan, Dr. Karl Ziegler *Director of Health Physics, Division of Oak Ridge National Laboratory.* DECONTAMINATION (RADIOACTIVE CONTAMINANTS) RADIOACTIVE WASTE DISPOSAL, other articles in health physics

Morgan, William E *President, Colorado State University* AGRICULTURE (in part)

Morris, Robert M *Radio Facilities Engineer, American Broadcasting Company.* TELEVISION TRANSMITTER

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Morrison, Dr George H *Head, Inorganic and Analytical Chemistry, General Telephone and Electronics Laboratories, Inc* EXTRACTION (in part), SEPARATION (CHEMICAL AND PHYSICAL)

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Moses, Dr Montrose J *Associate Professor of Anatomy, Duke University School of Medicine* CELL NUCLEUS, CELL STRUCTURES

Mossman, Prof Harland Winfield *Professor of Anatomy, Medical School, University of Wisconsin* PLACENTATION

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Mowrer, Dr O Hobart *Research Professor of Psychology, University of Illinois* AGGRESSION, FRUSTRATION

Moxon, Dr Alvin L *Professor and Associate Chairman, Animal Science Department, Ohio Agricultural Experiment Station* AGRICULTURAL SCIENCE (ANIMAL).

Mrak, Chancellor Emil Marcel *University of California at Davis* DISTILLED SPIRITS, YEAST, articles on industrial uses of yeast—all co-authored

Mudd, Prof Stuart *Professor of Microbiology (Phipps), University of Pennsylvania School of Medicine, Director, Microbiology Research Laboratory, Veterans Administration Hospital, Philadelphia* LYOPHILIZATION

Mueller, Prof. Erwin W. *Department of Physics, Pennsylvania State University.* FIELD-EMISSION MICROSCOPY

Muhlethaler, Prof Dr Kurt *Swiss Federal Institute of Technology, Zurich* CELL PLASTIDS

Mulliken, Prof. Robert Sanderson *Physics Department, University of Chicago* MOLECULAR STRUCTURE AND SPECTRA, MOLECULE

Munnecke, Dr. Donald E. *Associate Professor of Plant Pathology, University of California* ORNAMENTAL PLANT (in part).

Murphy, Dr Glenn *Distinguished Professor of Engineering and Head of Theoretical and Applied Mechanics, Iowa State University* FROUDE NUMBER, MACH NUMBER; MODEL THEORY; REYNOLDS NUMBER

Murphy, Harold P. *Research Chemical Engineer (retired), Electric Storage Battery Company* STORAGE BATTERY.

Murray, Dr. Grover E *Boyd Professor of Geology, Louisiana State University* CENOZOIC, articles on related divisions of geologic time (co-authored)

Murray, Dr Haydn H *Director of Applied Research, Georgia Kaolin Company* CLAY, COMMERCIAL.

Musacchia, Dr X. J *Department of Biology, St Louis University* HIBERNATION (in part).

Muskat, Dr Morris *Technical Coordinator, Production Department, Gulf Oil Corporation* PETROLEUM RESERVOIR ENGINEERING

Muther, Richard *Executive Director, Richard Muther and Associates* MATERIALS HANDLING, PLANT FACILITIES, PRODUCTION METHODS.

Muus, Dr Bent J *Research Biologist, Danish Institute for Fishery and Marine Research* GORDIOIDEA, NECTONEMATOIDEA, NEMATOMORPHA

Myer, Percy Livingstone *Project Engineer, Western Union Telegraph Company* TELEGRAPHY (in part)

Myrvik, Dr Quentin N *Department of Microbiology, University of Virginia School of Medicine* BACTERIAL ENZYME; BACTERIAL COENZYME (both in part)

N

Nachtrieb, Prof Norman Harry *Institute for the Study of Metals, and Department of Chemistry, University of Chicago* LIQUID, VAPOR PRESSURE, VISCOSITY OF LIQUIDS, other articles in physical chemistry

Nafe, Dr John E *Professor of Geophysics, Columbia University* MARINE SEDIMENTS (in part).

Nair, Dr John H *Consultant* FOOD MANUFACTURING (in part)

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Namias, Jerome *Chief, Extended Forecast Section, U.S Weather Bureau* WEATHER (FORECASTING AND PREDICTION)—in part.

Naylor, Dr Ernest *Lecturer in Zoology, University College of Swansea, Wales* VALVIFERA

Nedelsky, Prof Leo *Professor of Physical Sciences, University of Chicago* BALANCE (WEIGHING INSTRUMENT), MASS, WEIGHT, series of related articles

Nelsen, Prof Olin E *Professor of Zoology, Division of Biology, University of Pennsylvania* GLAND, articles on various glands

Nelson, Elton Glen [illegible]
Div [illegible]
tion [illegible]
Md [illegible]

Nelson, Prof Eric L *Department of Bacteriology, University of California at Los Angeles* BRUCELLACEAE.

Nelson, James Hugh *Chief, Geomagnetism Branch, U.S Coast and Geodetic Survey* DECLINOMETER, EARTH INDUCTOR, INCLINOMETER, MAGNETOMETER; VARIOMETER.

Nelson, Prof Lewton Vincent *Associate Professor in Farm Crops, Farm Crops Extension Project Leader, Michigan State University* BEAN (in part)

Nelson, Norman E *Vice-President and Chief Engineer, Doak Aircraft Company, Inc.* VERTICAL TAKE-OFF AND LANDING (VTOL)

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Nesbitt, Dr Herbert H. J. *Director of Science Division, Faculty of Arts and Sciences, Carleton University, Canada.* SARCOPTIFORMES.

Nettleton, Dr. Lewis L *Partner in Firm Geophysical Associates, International* SALT DOME

Neuhauser, Robert G *Engineering Leader, Camera Tube Design, Electron Tube Division, Radio Corporation of America.* TELEVISION CAMERA TUBE.

Neumann, Dr P Gerhard *Professor of Oceanography, New York University.* OCEAN WAVES (in part)

Newcombe, Dr Curtis Lakeman *Senior Investigator, U.S. Naval Radiological Defense Laboratory.* MARINE ECOSYSTEM.

Newton, Prof Chester Whittier *Assistant Professor of Meteorology, University of Chicago* HURRICANE, STORM, TORNADO, other articles on storms and winds

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Nicol, Dr Joseph A Colin *Experimental Zoologist, Marine Biological Association, Plymouth, England* NERVOUS SYSTEM (INVERTEBRATE)

Niedermair, John C *Technical Director of Preliminary Ship Design, Bureau of Ships, U S. Department of the Navy, Consultant Naval Architect.* NAVAL ARCHITECTURE, SHIP DESIGN

Nier, Prof Alfred O *University of Minnesota* MASS SPECTROSCOPE

Nierenberg, Prof William A *Department of Physics, University of California* NUCLEAR MOMENTS

Nigrelli, Dr Ross F. *Pathologist, New York Aquarium, New York Zoological Society, Adjunct Professor of Biology, New York University* MYXOSPORIDIA, articles on related taxonomic groups

Niven, Dr. Charles F, Jr *Associate Director, Research and Education, American Meat Institute Foundation, University of Chicago* MICROBIOLOGICAL METHODS, PASTEURIZATION, STERILIZATION

Nixon, Dr. Alan C *Research Supervisor, Shell Development Company* GASOLINE

Noback, Charles Robert *Department of Anatomy, College of Physicians and Surgeons, Columbia University* MUSCULAR SYSTEM (in part)

Noble, Dr James A *Geological Sciences, California Institute of Technology* BATHOLITH, LACCOLITH, PLUTON

Nordell, Eskel. *Director of Technical Information, The Permutit Company* WATER SOFTENING

Novick, Aaron *Institute of Molecular Biology, University of Oregon* CHEMOSTAT

Novikoff, Dr. Alex B *Research Professor of Pathology, Albert Einstein College of Medicine, Yeshiva University* CYTOCHEMISTRY

O

Obery, Leonard J *Chief, 10 x 10 Supersonic Wind Tunnel Branch, Propulsion Aerodynamics Division, National Aeronautics and Space Administration* DIFFUSER, SUPERSONIC DIFFUSER (both in part).

O'Connor, Dr. Donald J *Associate Professor of Civil Engineering, Manhattan College* SEWAGE DISPOSAL; WATER POLLUTION

O Connor, Francis Martin *Group Leader, Molecular Sieve Products, Linde Company, Division of Union Carbide Corporation* MOLECULAR SIEVE (in part).

Odum, Dr Eugene Pleasants. *Alumni Foundation Professor of Zoology, University of Georgia* ECOLOGY.

Ofner, Dr. Alfred *Director of Technical Development, Hoffman-LaRoche, Inc* VITAMIN E; VITAMIN K (both in part).

Ogle, Dr. Kenneth N *Section of Biophysics, Mayo Clinic.* STEREOSCOPY

Ohman, M F. *Manager of Operations, Western Division, Dow Chemical Company* IODINE (in part).

Okulitch, Dr Vladimir J. *Professor and Head, Department of Geology, University of British Columbia, Canada* ARCHAEOCYATHA, PORIFERA FOSSILS.

Oldenburger, Prof Rufus *School of Mechanical Engineering, Purdue University* GOVERNOR, LINKAGE, MECHANICAL.

Olson, Prof Everett Claire *Department of Geology, University of Chicago* ANAPSIDA, SYNAPSIDA, articles on related fossil groups

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Osberg, Prof Philip Henry *University of Maine* FAULT AND FAULT STRUCTURES, FOLD AND FOLD SYSTEMS, other articles in structural geology

Oser, Dr Bernard L *Food and Drug Research Laboratories, Inc, New York City* FOOD (in part)

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Otis, Dr A B *Department of Physiology, College of Medicine, University of Florida* RESPIRATION, EXTERNAL, SPIROMETRY.

Owen, Dr Bradford Breckenridge *Associate Professor of Biology, Lehigh University.* KIDNEY.

P

Packard, Dr Charles E *Assistant Professor of Biology, Randolph-Macon College, Ashland, Virginia.* CHAETONOIDEA; GASTROTRICHA, MACRODASYOIDEA.

Page, Dr Robert M. *Associate Professor, Department of Biological Sciences, Stanford University* ASCOMYCETES, BASIDIOMYCETES, series of articles on related groups of fungi

Pai, Prof Shih I *Research Professor, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.* LAMINAR FLOW, TURBULENT FLOW, VISCOUS FLOW

Pake, Prof George E *Physics Department, Stanford University* DYNE, FORCE, NEWTON, POUNDAL

Palmerlee, Prof Albert S *Professor of Engineering Drawing, School of Engineering and Architecture, The University of Kansas* DESCRIPTIVE GEOMETRY, ENGINEERING DRAWING, PICTORIAL DRAWING (all in part)

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Parks, Prof. Roland D *Geology and Geophysics Department, Massachusetts Institute of Technology* MINING OPERATING FACILITIES (in part).

Parr, Prof. Robert G. *Department of Chemistry, Carnegie Institute of Technology.* VALENCE

Parrish, Dr William *Chief, X-ray and Crystallography Sections, Philips Laboratories* X-RAY FLUORESCENCE ANALYSIS; X-RAY POWDER METHODS.

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Patten, Dr. Bradley M *Professor of Anatomy, University of Michigan Medical School* CARDIOVASCULAR SYSTEM (in part).

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Patton, Dr. Harry Dickson *Professor of Physiology and Biophysics, University of Washington School of Medicine* MOTOR SYSTEMS, POSTURE, REGULATION OF, REFLEX, UNCONDITIONED (all in part)

Pattullo, Dr. June G *Scripps Institution of Oceanography.* SEA LEVEL (DATUM PLANES); SEA LEVEL FLUCTUATIONS, SEA WATER (in part).

Payne, Harold G *Manager, Measurements Group, The Foxboro Company* PRESSURE MEASUREMENT, VACUUM MEASUREMENT, other articles on pressure and vacuum instrumentation

Peck, Prof Raymond E *Department of Geology, University of Missouri* CHAROPHYTA

Pederson, Dr. Carl S *New York State Agricultural Station* LACTOBACILLACEAE

Peirce, Willis McGerald *Assistant to the President, New Jersey Zinc Company* CADMIUM METALLURGY, ZINC ALLOYS; ZINC METALLURGY

Pennak, Dr Robert William *Department of Biology, University of Colorado* MYSTACOCARIDA

Perch, Michael *Verona Research Center, Koppers Company, Inc* COKE

Perkins, Dr. David D *Department of Biological Sciences, Stanford University* LINKAGE, GENETIC, RECOMBINATION, GENETIC, SEX-LINKED INHERITANCE

Perkins, Kenneth W *Physical Sciences Editor, McGraw-Hill Encyclopedia of Science and Technology* METAL, PRECESSION OF EQUINOXES, ROCKET ASTRONOMY, articles in physics and acoustical engineering

Perry, Astor *Extension Agronomist, North Carolina State College* PEANUT (in part)

Pette, Prof Dr Jan Willem *Director-in-Chief, The Netherlands Institute for Dairy Research at Ede; Professor in Milk Hygiene, University of Utrecht* MILK (in part)

Pettit, Dr Edison *Member, Scientific Staff (retired), Mount Wilson and Mount Palomar Observatories* OBSERVATORY, ASTRONOMICAL

Pfaffmann, Dr. Carl *Professor of Psychology, Brown University.* SENSE, CHEMICAL, SMELL, TASTE

Phaff, Dr Herman Jan *Professor of Food Science and Technology, University of California at Davis* DISTILLED SPIRITS, FOOD MICROBIOLOGY, YEAST (all in part); series of articles on fungi.

Phelan, Richard M *Associate Professor of Mechanical Engineering, Cornell University* FRICTION; SCREW; SIMPLE MACHINE; other articles in machine design

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Philpott, Dr Jane *Associate Professor of Botany, Duke University* LEAF (BOTANY)—in part

Pierce, Prof E Lowe *Department of Biology, University of Florida* CHAETOGNATHA.

Pierson, Prof Willard James *Department of Meteorology and Oceanography, College of Engineering, New York University* OCEAN WAVES (in part).

Pilgrim, Lieutenant Hal Wilson *U S Navy.* UNDERWATER DEMOLITION

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Platt, Dr Robert Baxter *Professor of Biology, Emory University.* ENVIRONMENT

Plummer, Harry Custer *Director of Engineering and Technology, Structural Clay Products Institute.* MASONRY

Pogorzelski, H A *'Mathematical Reviews', American Mathematical Society* MATHEMATICAL NOTATION, CONTEMPORARY (in part)

Pollard, Dr Ernest C *Chairman, Department of Biophysics, Yale University* RADIATION BIOLOGY

Pollard, Dr William Grosvenor. *Executive Director of Oak Ridge Institute of Nuclear Studies* PHYSICS

Pollister, Prof Arthur W *Columbia University* CELL (BIOLOGICAL)—in part, CENTRIOLE, CENTROSOME, PROTOPLASM (in part)

Polster, Dr Harry D *The Perkin-Elmer Corporation* MIRROR OPTICS, REFLECTION (ELECTROMAGNETIC RADIATION)

Ponikvar, Ade L *Editor, Production and Drilling, 'Petroleum Week,' McGraw-Hill Publishing Company.* OIL MINING, articles on various drills

Poole, Lynn *Director of Public Relations, Johns Hopkins University* ART, SCIENCE IN

Pope, Alan *Head, Aerodynamics Department, Sandia Corporation* WIND TUNNEL.

Porter, Prof Joseph P *Professor emeritus, Cornell University* LANDSCAPE ARCHITECTURE

Porter, Prof Keith Roberts *The Rockefeller Institute.* CELL INCLUSIONS, NONCYTOPLASMIC, CYTOLOGY, CYTOPLASM

Post, Dr Richard F *Lawrence Radiation Laboratory, University of California, Livermore.* FUSION, NUCLEAR, PLASMA PHYSICS, PROTON-PROTON CHAIN; THERMONUCLEAR REACTION

Potter, Prof. M David. *Professor, San Francisco State College* TEXTILE, articles on various animal and plant fibers

Poulson, Prof Donald F *Professor of Biology, Department of Zoology, Yale University* LETHAL GENE

Powell, Dr Wilson Frederick *Department of Pathology, Yale University School of Medicine* ATROPHY; DEATH; HYPERTROPHY, series of related articles

Parker, Eugene N. *Associate Professor, Fermi Institute and Department of Physics, University of Chicago* COSMIC RAYS.

Parkes, Dr. Kenneth Carroll *Associate Curator of Birds, Carnegie Museum* AVES, articles on related taxonomic groups

Parks, Prof. George Sutton. *Department of Chemistry, Stanford University* CALORIMETRY; THERMOCHEMISTRY

Parks, Prof Roland D. *Geology and Geophysics Department, Massachusetts Institute of Technology.* MINING OPERATING FACILITIES (in part).

Parr, Prof. Robert G *Department of Chemistry, Carnegie Institute of Technology* VALENCE

Parrish, Dr. William. *Chief, X-ray and Crystallography Sections, Philips Laboratories.* X-RAY FLUORESCENCE ANALYSIS, X-RAY POWDER METHODS.

Parry, Prof. Robert Walter. *Department of Chemistry, University of Michigan* CHELATION

Patten, Dr. Bradley M. *Professor of Anatomy, University of Michigan Medical School.* CARDIOVASCULAR SYSTEM (in part)

Patterson, Dr. Claire Cameron *Division of Geological Sciences, California Institute of Technology.* EARTH (AGE OF)

Patton, Dr Harry Dickson. *Professor of Physiology and Biophysics, University of Washington School of Medicine* MOTOR SYSTEMS, POSTURE, REGULATION OF, REFLEX, UNCONDITIONED (all in part).

Pattullo, Dr June G *Scripps Institution of Oceanography* SEA LEVEL (DATUM PLANES), SEA LEVEL FLUCTUATIONS, SEA WATER (in part).

Payne, Harold G *Manager, Measurements Group, The Foxboro Company* PRESSURE MEASUREMENT, VACUUM MEASUREMENT, other articles on pressure and vacuum instrumentation

Peck, Prof. Raymond E *Department of Geology, University of Missouri* CHAROPHYTA

Pederson, Dr. Carl S *New York State Agricultural Station* LACTOBACILLACEAE

Peirce, Willis McGerald *Assistant to the President, New Jersey Zinc Company* CADMIUM METALLURGY, ZINC ALLOYS, ZINC METALLURGY

Pennak, Dr Robert William *Department of Biology, University of Colorado* MYSTACOCARIDA.

Perch, Michael *Verona Research Center, Koppers Company, Inc* COKE

Perkins, Dr. David D *Department of Biological Sciences, Stanford University* LINKAGE, GENETIC, RECOMBINATION, GENETIC, SEX-LINKED INHERITANCE

Perkins, Kenneth W *Physical Sciences Editor, McGraw-Hill Encyclopedia of Science and Technology* METAL, PRECESSION OF EQUINOXES, ROCKET ASTRONOMY, articles in physics and acoustical engineering

Perry, Astor. *Extension Agronomist, North Carolina State College* PEANUT (in part)

Pette, Prof Dr Jan Willem *Director-in-Chief, The Netherlands Institute for Dairy Research at Ede, Professor in Milk Hygiene, University of Utrecht* MILK (in part)

Pettit, Dr Edison *Member, Scientific Staff (retired), Mount Wilson and Mount Palomar Observatories* OBSERVATORY, ASTRONOMICAL

Pfaffmann, Dr Carl *Professor of Psychology, Brown University* SENSE, CHEMICAL, SMELL, TASTE

Phaff, Dr Herman Jan *Professor of Food Science and Technology, University of California at Davis* DISTILLED SPIRITS, FOOD MICROBIOLOGY; YEAST (all in part), series of articles on fungi

Raffel, Dr. Sidney. *Stanford University School of Medicine* ALLERGY, ATOPIC; ANAPHYLAXIS, ARTHUS REACTION, HYPERSENSITIVITY.

Ragazzini, Dr John R. *Dean, College of Engineering, New York University* COMPUTER CONTROL SYSTEM; PROCESS CONTROL; SAMPLED-DATA CONTROL SYSTEM, other articles on control systems

Ragotzkie, Prof. Robert A *Department of Meteorology, University of Wisconsin.* MARINE MARSH

Raisz, Dr Erwin *Visiting Professor, Clark University* CARTOGRAPHY; GREAT CIRCLE, TERRESTIAL; MAP SCALE.

Rakestraw, Dr Norris W *Scripps Institution of Oceanography, University of California* SEA WATER (in part).

Ramberg, Dr Edward G *Fellow, Technical Staff, Radio Corporation of America Laboratories.* ELECTRON MOTION IN VACUUM, ELECTROSTATIC LENS, MICROSCOPE, ELECTRON (in part), other articles on electron optics

[illegible]

Ramsdell, Prof Lewis Stephen *Chairman, Department of Mineralogy, University of Michigan* MINERAL, MINERALOGY.

Ramsey, Dr Glen Blaine *Principal Pathologist, Agricultural Marketing Service, U.S Department of Agriculture* LETTUCE, ONION (both in part)

Raper, Prof John R *Professor of Botany, Harvard University* EUMYCETES

Raper, Prof Kenneth B. *Departments of Bacteriology and Botany, University of Wisconsin* ACRASIALES, LABYRINTHULALES

Rashevsky, Prof Nicolas *Committee on Mathematical Biology, University of Chicago* BIOPHYSICS, MATHEMATICAL

Raski, Dr Dewey J *Nematologist, Department of Plant Nematology, University of California at Davis* NEMATOCIDE.

Ratliff, Dr Floyd *The Rockefeller Institute* BEHAVIORAL PSYCHOPHYSICS

Ratnoff, Dr Oscar D *Associate Professor of Medicine, Western Reserve University, Career Investigator, American Heart Association* BLOOD (in part), FIBRINOGEN

Raudebaugh, Dr Robert J *Development and Research Division, International Nickel Company, Inc* NICKEL ALLOYS

Rausch, Dr Marvin *Friedastrass, Munchen-Solln, West Germany* REFORMATSKY REACTION, GRIGNARD REACTION, ORGANOMETALLIC COMPOUND, TETRAETHYLLEAD

Rawles, Dr Mary Elbert *Staff Member, Department of Embryology, Carnegie Institution of Washington; Assistant Professor of Anatomy, Johns Hopkins University* FEATHER (BIRD); UROPYGIAL GLAND

Razran, Prof Gregory *Professor and Chairman, Department of Psychology, Queens College* REFLEX, CONDITIONED

Read, Prof Clark P *Department of Biology, Rice University* CESTODA, articles on related taxonomic groups.

Reddish, Dr George Fults *St Louis College of Pharmacy and Allied Sciences* ANTISEPTIC

Redlich, Dr Fredrick Carl *Professor and Chairman, Department of Psychiatry, Yale University School of Medicine* PSYCHOANALYSIS, PSYCHOTHERAPY, articles on various psychoses

Reed, Prof Fredda D *Professor of Botany, Mount Holyoke College.* CALAMITALES

Reed, Prof Richard John *University of Washington* FRONT

Presley, Dr John T. *Leader, Cotton Pathology Investigations, Cotton and Cordage Fibers Research Branch, Crops Research Division, Agricultural Research Service, U S. Department of Agriculture.* COTTON (in part).

Press, Dr. Frank *California Institute of Technology Seismological Laboratory.* SEISMOGRAPH; SEISMOLOGY.

Prien, Dr Charles H. *Head, Chemistry and Chemical Engineering Division, Denver Research Institute, University of Denver* PYROLYSIS.

Priester, Gayle B *Baltimore Gas and Electric Company.* HEATING, COMFORT

Pringsheim, Prof. E G *Pflanzenphysiologisches Institut, Göttingen, Germany* BEGGIATOALES, CARYOPHANALES, CHLAMYDOBACTERIALES.

Pritchard, Prof Donald William *Chairman, Department of Oceanography, Johns Hopkins University* ESTUARINE OCEANOGRAPHY (in part).

Pritchett, W S *Associate Professor of Electrical Engineering, University of California* INDUCTOR; REACTOR, ELECTRIC (both in part).

Proctor, Prof Bernard Emerson. *Former Professor and Head, Department of Food Technology, Massachusetts Institute of Technology* FOOD (in part)

Prophet, Prof Edward C. *Department of Geography, Michigan State University* NORTH AMERICA (in part)

Prosser, Prof C Ladd *Physiology Department, University of Illinois* HOMEOSTASIS

Protter, Prof Murray H *Professor of Mathematics, University of California* POTENTIALS (MATHEMATICS)

Pryke, John K M *Senior Partner, Slocum and Fuller, New York* CENTRAL HEATING

Puchstein, Albert Frederick *Consulting Engineer* ALTERNATING-CURRENT MOTOR, MOTOR, ELECTRIC, series of related articles

Puck, Dr Theodore T *Department of Biophysics, University of Colorado* CULTURE, TISSUE

Pullen, Dr Keats A. *Ballistic Research Laboratories, Aberdeen Proving Ground, Maryland* CIRCUIT, ELECTRONIC, TRANSFORMER (both in part)

Putnam, Prof Russell Caldwell *Professor of Electrical Engineering, Case Institute of Technology* PHOTOMETRY, PHOTOMETER, other articles on photometric units

Putz, T J *Industrial Gas Turbine Department, Westinghouse Electric Corporation* GAS TURBINE

Pyddoke, Edward *Secretary and Registrar, University of London Institute of Archaeology, England* ARCHEOLOGY

Q

Quastler, Dr Henry *Senior Radiobiologist, Brookhaven National Laboratory* INFORMATION THEORY (BIOLOGICAL APPLICATIONS)

Quirin, Edward J *Frederic R Harris, Inc, Consulting Engineers* COASTAL ENGINEERING, COFFERDAM, other articles in coastal engineering

R

Raacke, Dr Else Dorothea *Associate Research Scientist, Kaiser Research Institute* DEOXYRIBONUCLEIC ACID, RIBONUCLEIC ACID

Raasch, Dr Gilbert O *Consulting Paleontologist, Shell Oil of Canada* EURYPTERIDA, MEROSTOMATA

Rabinowitch, Dr. Eugene *Department of Botany, University of Illinois* PHOTOSYNTHESIS

Rademacher, Prof. Hans *Professor of Mathematics, University of Pennsylvania* NUMBER THEORY, ZERO.

Riley, Prof. Reed F. *Department of Chemistry, Polytechnic Institute of Brooklyn.* ALKALINE-EARTH METALS; BARIUM; CALCIUM; STRONTIUM

Ris, Prof. Hans *Department of Zoology, University of Wisconsin* CHROMOSOME, CHROMOSOME ABERRATION.

Ritchey, Dr. H. W. *Vice-President, Rocket Operations, Thiokol Chemical Corporation* PROPELLANT (in part).

Rittenberg, Dr Sydney C *Professor of Bacteriology, University of Southern California.* SPIROCHAETALES; articles on related taxonomic groups, WATER ANALYSIS, other articles in water microbiology.

Roberts, J K *Standard Oil Company* NAPHTHA; PETROLATUM

Robertson, Prof Burtis Lowell *Professor of Electrical Engineering, University of California.* ALTERNATING-CURRENT CIRCUIT THEORY, CAPACITOR; WAVEFORM, NONSINUSOIDAL—all in part; other articles on electric circuits and components

Robertson, Dr James S *Head, Medical Physics Division, Medical Department, Brookhaven National Laboratory* RADIOISOTOPE (BIOLOGY)

Robertson, Lemuel Carson. *Manager of Ship Repair Sales, Newport News Shipbuilding and Dry Dock Company* DRYDOCKING

Robillard, Dr Jean Jules *Vice-President, Director of Research, General Transistor Corporation* PHOTOCONDUCTIVE CELL; PHOTOVOLTAIC CELL.

Robinson, Prof Arthur H *Department of Geography, University of Wisconsin* COORDINATE SYSTEMS, TERRESTRIAL; MAP PROJECTIONS, other articles on maps, SOIL, ZONAL DISTRIBUTION

Rochford, David James *Principal Research Officer, Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Australia* INDIAN OCEAN (in part)

Rochow, Prof Eugene George *Harvard University* ELECTROCHEMICAL SERIES, ELECTRONEGATIVITY, SILICON.

Rockett, Frank H *Engineering Staff Editor, McGraw-Hill Encyclopedia of Science and Technology* Series of articles in astronomy and engineering

Roddis, Louis H, Jr *Chairman, Maritime Research Advisory Committee, National Academy of Sciences—National Research Council, President, Pennsylvania Electric Company* REACTOR, SHIP PROPULSION

Rodebush, Prof W H *Department of Chemistry and Chemical Engineering, University of Illinois* AEROSOL, HYDROGEN BOND

Rodenhiser, Dr Herman A *Assistant Administrator, Agricultural Research Service, U.S. Department of Agriculture* MILLET, SORGHUM (both in part)

Rodgers, John *Professor of Geology, Yale University* DIASTEM, STRATIGRAPHIC NOMENCLATURE, STRATIGRAPHY, UNCONFORMITY

Roedder, Dr Edwin *Geologist, U.S Geological Survey* ORE DEPOSITS, GEOCHEMISTRY OF (in part).

Roeder, Prof Kenneth D *Professor of Physiology, Department of Biology, Tufts University* INSECT PHYSIOLOGY

Rogers, Dr Terence A *Department of Physiology, Stanford University School of Medicine* METABOLISM IN RUMINANTS, DIGESTIVE SYSTEM (in part)

Rogick, Dr Mary Dora *Professor of Biology, College of New Rochelle* BRYOZOA, articles on related taxonomic groups

Rogowski, Prof Augustus R. *Massachusetts Institute of Technology* COMBUSTION CHAMBER; IGNITION SYSTEM, LUBRICATION, ENGINE, series of related articles

Rollet, Dr Duane E. *Harvey Mudd College and Space Technology Laboratories, Inc.* CONSERVATION OF ENERGY, [illegible]

Reed, Dr. Roger W. *Professor and Chairman, Department of Bacteriology and Immunology, McGill University, Canada* LISTERIOSIS.

Rees, Dr Bryant E *Professor of Biology, Fresno State College.* ENDOPTERYGOTA; MECOPTERA.

Reeve, Dr. Roger M. *Histologist, Western Utilization Research and Development Division, U. S. Department of Agriculture.* SEED (BOTANY).

Reid, Dr. Evans Burton *Merrill Professor of Chemistry, Chairman of Department of Chemistry, Colby College.* CARBOXYLIC ACID; ESTER; articles on various derivatives of carboxylic acid.

Reid, Joseph Lee, Jr *Assistant Research Oceanographer, Scripps Institution of Oceanography, University of California.* PACIFIC OCEAN; SEA WATER (in part).

Reid, Prof. Robert O *Department of Oceanography and Meteorology, Agricultural and Mechanical College of Texas.* STORM SURGE.

Reifsnyder, Dr. William Edward *Associate Professor of Forest Meteorology, Yale School of Forestry* FOREST FIRE CONTROL.

Reinmuth, Prof William H. *Assistant Professor of Chemistry, Columbia University* ANALYTICAL CHEMISTRY, POLAROGRAPHIC ANALYSIS.

Reischman, O S.B , Rev Placidus George. *Head of Department of Biology, St Martin's College* PARASITIC CASTRATION, RHIZOCEPHALA

Renfrow, Dr William B , Jr *Department of Chemistry, Oberlin College* CONDENSATION REACTION

Reno, Horace T. *U S. Bureau of Mines* MINING OPERATING FACILITIES (in part)

Renzoni, Louis Secondo *Manager, Process Research, International Nickel Company of Canada, Ltd* NICKEL METALLURGY

Reyniers, Prof James Arthur *Director, Germfree Life Research Center, Tampa* GERMFREE VERTEBRATE

Rich, Prof Alexander *Associate Professor of Biophysics, Massachusetts Institute of Technology* MOLECULAR BIOPHYSICS.

Rich, Dr Saul *Plant Pathologist, The Connecticut Agricultural Experiment Station* FUNGISTAT AND FUNGICIDE (in part)

Richards, Dr Geoffrey Norman *British Rayon Research Association, Manchester, England* CELLULOSE, GLUCOSIDE, GLYCOSIDE (all in part)

Richards, Dr Oscar W *Chief Biologist, American Optical Company Research Center* MICROSCOPE, MICROSCOPE, FLUORESCENCE (in part), MICROSCOPE, OPTICAL (in part)

Richey, Clarence Bentley *Chief Research Engineer, Tractor and Implement Division, Ford Motor Company* AGRICULTURAL ENGINEERING; AGRICULTURAL MACHINERY, DAIRY MACHINERY

Richmond, John Paul *Vice-President, Finance (retired), ACF Industries, Inc* INDUSTRIAL CONTROL

Riddell, Prof John Evans *Professor of Geology, Carleton University, Canada* GEOCHEMICAL PROSPECTING

Riehl, Dr Herbert. *University of Chicago* TROPICAL METEOROLOGY.

Riggs, Dr Austen Fox *Department of Zoology, University of Texas.* RESPIRATORY PIGMENTS.

Riggs, Harold C *Staff Assistant, Engineering, Electric Storage Battery Company* BATTERY (ELECTRIC)

Riggs, Prof Lorrin Andrews *Department of Psychology, Brown University* COLOR; COLOR VISION; VISION; articles on various colors.

Russell, Dr. H W *Technical Director, Battelle Memorial Institute* BOLOMETER; DEWAR FLASK; INCANDESCENCE, RADIOMETRY; RADIOMICROMETER

Russell, Prof Richard J *Professor of Geography, Dean, Graduate School, Louisiana State University* COASTAL LANDFORMS; ESCARPMENT, FLOOD PLAINS; FLUVIAL EROSION CYCLE

Russell, Prof Roger Wolcott *Department of Psychology, Indiana University* HYPOTHERMIA.

Ryan, Prof. James J *Mechanical Engineering Department, Institute of Technology, University of Minnesota* BRAKE (in part); CLUTCH (in part); COUPLING; other articles in machine design

Ryther, Dr. John H *Woods Hole Oceanographic Institution* SEA WATER FERTILITY (in part)

S

Sacks, Dr Martin *Biology Department, City College of New York* KINORHYNCHA.

Sackston, Dr Waldemar E *Head, Plant Pathology Laboratory, Research Station, Canada Department of Agriculture* SUNFLOWER (in part)

Salton, Dr Milton R J *Department of Bacteriology, University of Manchester, England* BACTERIAL CELL CHEMISTRY

Salutsky, Dr Murrell Leon *Supervisor, Agricultural Chemical Research, W R Grace and Company* RADIUM

Sandage, Dr Allan R *Assistant Astronomer, Mount Wilson and Palomar Observatories* ANDROMEDA NEBULA, GALAXY, EXTERNAL, MAGELLANIC CLOUDS, METAGALAXY

Sanders, Prof Frederick *Massachusetts Institute of Technology* JET STREAM, MONSOON, WIND, series of related articles

Sanders, Vice Admiral (Retired), Harry *Director, Antisubmarine Warfare Engineering, Chance Vought Aircraft, Inc* ANTISUBMARINE WARFARE

Sanders, Dr Howard Lawrence *Woods Hole Oceanographic Institution* CEPHALOCARIDA

Sandretto, Gen Peter C *Deputy Group Executive, U.S Defense Group, International Telephone and Telegraph Corporation* AIR TRAFFIC CONTROL, INSTRUMENT LANDING SYSTEM (ILS), NAVIGATION SYSTEMS, ELECTRONIC, other articles on electronic navigation systems

Sannella, Joseph L *Department of Biochemistry, Purdue University* HEMICELLULOSE (in part)

Sargent, Lauren Francis *Senior Consultant, H B. Maynard and Company, Inc* INVENTORY MANAGEMENT, PRODUCTION PLANNING

Saul, Dr Everett L *Director of Scientific Liaison, Products Division, Bristol-Myers Company* ESSENTIAL OILS, TERPENE, WOOD CHEMICALS, other articles on terpenes

Saunders, Capt Harold Eugene *Technical Assistant to the Chief, Bureau of Ships, U.S Navy Department* SHIP SALVAGE

Saunders, Harry Merritt *Assistant Vice-President, Private Wire Services, Western Union Telegraph Company* TELEGRAPHY (in part)

Saunders, Prof John W, Jr. *Professor of Zoology and Chairman of Biology Department, Marquette University* INTEGUMENT (in part)

Saur, J F T. *Oceanographer, U.S Fish and Wildlife Service* BERING SEA

Savage, Dr Donald Elvin *Associate Professor of Paleontology, University of California* PROBOSCIDEA FOSSILS, EDENTATA FOSSILS, articles on other fossil groups

Savage, Dr George Mason *Manager, Microbiological Research, The Upjohn Company* ANTIMICROBIAL AGENTS ...

Romer, Prof. Alfred Sherwood *Museum of Comparative Zoology, Harvard University.* AMPHIBIA FOSSILS; ANIMAL EVOLUTION; ELASMOBRANCHII FOSSILS; articles on other fossil groups

Roosen-Runge, Prof. Edward C *University of Washington School of Medicine.* ADRENAL GLAND, TESTIS (both in part).

Root, Dr William L. *Lincoln Laboratory, Massachusetts Institute of Technology* NOISE, ELECTRICAL; NOISE GENERATOR, ELECTRICAL.

Rosenberg, Leon Theodore *Chief Generator Design Engineer, Steam Turbine Department, Allis-Chalmers Manufacturing Company.* ALTERNATING-CURRENT GENERATOR; ELECTRIC ROTATING MACHINERY, GENERATOR, ELECTRIC, series of related articles.

Rosenberger, Sir Harold E *Bausch and Lomb Optical Company* BINOCULARS, OPERA GLASSES.

Rosenblatt, Dr Jay S *Associate Research Specialist, Institute of Animal Behavior, Rutgers University.* BEHAVIOR, ONTOGENY OF (in part).

Ross, Dr Edward Shearman *Curator, Department of Entomology, California Academy of Sciences* EMBIOPTERA

Ross, Dr Herbert H *Illinois Natural History Survey* TRICHOPTERA.

Ross, Dr Robert Simon *Goodyear Aircraft Corporation* AEROSTAT; AIRSHIP, BALLOON, BLIMP, DIRIGIBLE—all in part

Ross, Prof Sydney *Professor of Colloid Science, Rensselaer Polytechnic Institute* COACERVATION, ELECTROPHORESIS, FOAM

Rosvold, Dr H Enger *Laboratory of Psychology, National Institute of Mental Health* MEMORY

Roth, Willard *Assistant Chief Engineer, Sunbeam Equipment Corporation* RESISTANCE HEATING

Rowell, Dr John Bartlett *Crops Research Division, Agricultural Research Service, U S Department of Agriculture, Department of Plant Pathology and Botany, University of Minnesota* PLANT DISEASE (in part).

Roy, Dr Chalmer J *Professor and Head of Geology, Iowa State University* LOESS, TILL

Roy, Prof Rustum *Professor of Geochemistry, Pennsylvania State University* HIGH-PRESSURE PHENOMENA (in part)

Rubey, Dr William W *U S Geological Survey* OROGENY

Ruch, Prof Theodore C *Department of Physiology and Biophysics, University of Washington School of Medicine* EFFECTOR SYSTEMS, MOTOR SYSTEMS, POSTURE, REGULATION OF, REFLEX, UNCONDITIONED (all in part)

Rudnick, Dr Dorothea *Professor of Biology, Albertus Magnus College, Associate in Research, Yale University* EMBRYOLOGY, EXPERIMENTAL

Rudnick, Philip *Research Physicist, Marine Physical Laboratory of the Scripps Institution of Oceanography, University of California at La Jolla* SEA WATER (in part)

Runcorn, Prof Stanley Keith *Physics Department, King's College, England* ROCK MAGNETISM

Rupp, Arthur F *Oak Ridge National Laboratory, Union Carbide Corporation* RADIOISOTOPE PRODUCTION.

Rushton, Prof. J Henry *Professor of Chemical Engineering, Purdue University* MIXING

Rusk, Dr Rogers D *Mount Holyoke College* ACCELERATION (in part); MOTION, RECTILINEAR; VELOCITY (in part), series of related articles

Rusnak, Dr. Gene Alexander. *Assistant Professor of Marine Geology, The Marine Laboratory, University of Miami* MARINE SEDIMENTS; OCEANOGRAPHY (both in part).

Schwan, Harry T. *Vice-President, H. B Maynard and Company* OPERATOR TRAINING; WORK STANDARDIZATION.

Schweizer, Ernest *President and Chief Engineer, Schweizer Aircraft Corporation* GLIDER; SAILPLANE.

Scofield, Francis *Director, Scientific Section, National Paint, Varnish and Lacquer Association.* PAINT; PIGMENT; SURFACE COATING, series of related articles

Scott, Dr. J. Allen *Professor of Preventive Medicine; Director of Helminth Research Laboratory, University of Texas Medical Branch* DIOCTOPHYMOIDEA; DRACUNCULOIDEA; RHABDIASOIDEA; TRICHUROIDEA

Scott, Dr John Edward, Jr *Associate Professor of Aeronautical Engineering, University of Virginia* COMPRESSIBLE FLOW, SUPERSONIC FLIGHT.

Scott, Dr John Paul *Senior Staff Scientist, Behavior Laboratory, Roscoe B Jackson Memorial Laboratory* SOCIAL ANIMALS; SOCIAL HIERARCHY

Scott, Dr Richard Albert *U.S. Geological Survey* FOSSIL SEEDS AND FRUITS.

Scott, Prof Robert L *Professor of Chemistry, University of California at Los Angeles* BOILING POINT, EQUILIBRIUM, PHASE; SECOND-ORDER TRANSITION, other articles in physical chemistry

Scott, Dr Roderic M *Perkin-Elmer Corporation, Norwalk, Connecticut* ASTRONOMICAL INSTRUMENTS.

Seaborg, Dr Glenn T *Office of the Chancellor, University of California* ACTINIDE ELEMENTS, TRANSURANIUM ELEMENTS.

Sears, Prof Paul Bigelow *Chairman, Conservation Program, Yale University* POSTGLACIAL VEGETATION AND CLIMATE

Sebald, Joseph F *Chief Engineer, Steam Power Section, Harrison Division, Worthington Corporation* CONDENSER, VAPOR, COOLING TOWER, STEAM JET EJECTOR, series of related articles

Sechler, Dr. Ernest E *Professor of Aeronautics, California Institute of Technology.* SPACE TECHNOLOGY, SPACE VEHICLE

Seefeldt, Fred C *Staff Advisor, Customer Service, Liquid Carbonic Division, General Dynamics Corporation* CARBON DIOXIDE

Seelye, E E *Seelye Stevenson Value and Knecht, Consulting Engineers, New York* AIRPORT ENGINEERING, RUNWAY, AIRPORT (both in part)

Segrè, Prof Emilio *University of California* ANTIMATTER, ANTINEUTRON; ANTIPROTON, NUCLEON, PROTON

Seifert, Dr William Walther *Associate Professor of Electrical Engineering, Assistant to the Dean of Engineering, Massachusetts Institute of Technology* ANALOG COMPUTER, DIFFERENTIAL ANALYZER, SLIDE RULE.

Seiff, Alvin *National Aeronautics and Space Administration, Ames Research Center, Moffett Field, California* BALLISTIC RANGE

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Sekera, Prof Zdenek *University of California at Los Angeles* METEOROLOGICAL OPTICS; articles on various phenomena

Selby, Dr Cecily Cannan *Headmistress, The Lenox School, New York* INTEGUMENT (in part).

Sell, Heinz Georg *Senior Research Engineer, Research Department, Lamp Division, Westinghouse Electric Corporation* HEAT RADIATION; series of related articles (all co-authored)

Sellars, Dr John Randolph *Manager, Aerodynamics Department, Space Technology Laboratories* AERONAUTICAL ENGINEERING, AERONAUTICS, AEROSTATICS, FLIGHT DYNAMICS, FLIGHT SCIENCE

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Sayre, Dr Albert Nelson *Senior Scientist, U S Geological Survey* ATMOSPHERIC EVAPORATION, GROUND WATER, HYDROLOGY, other articles in hydrology

Schaaf, Prof Samuel A *Professor of Engineering Science; Chairman, Division of Aeronautical Sciences, University of California* SUPERAERODYNAMICS

Schaefer, Dr. Milner Baily *Director of Investigations, Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography* MARINE FISHERIES, MARINE RESOURCES.

Schaeffer, Dr. Bobb *The American Museum of Natural History* OSTEICHTHYES FOSSILS

Scheer, Prof Bradley Titus *Professor and Head, Biology Department, University of Oregon* CIRCULATION, ENDOCRINE MECHANISMS

Schelleng, John C *Director of Radio Research (retired), Bell Telephone Laboratories, Inc* ANTENNA (AERIAL), CORNER REFLECTOR ANTENNA, YAGI ANTENNA

Schleicher, Richard L *Chief, Structures Engineer, North American Aviation, Inc* AIRFRAME.

Schmerling, Dr Louis *Coordinator, Exploratory Research, Chemical Products Research Division, Universal Oil Products Company* ALKANE, HYDROCARBON, PETROLEUM, series of related articles

Schmid, Rudi *Assistant Professor, Thorndike Memorial Laboratory, Harvard Medical School* PORPHYRIN

Schmidt, Dr Paul W. *Associate Professor of Physics, University of Missouri* COLLISION, CONSERVATION OF MOMENTUM, VIRTUAL WORK, PRINCIPLE OF, series of related articles

Schmidt-Nielsen, Dr Bodil Mimi *Department of Zoology, Duke University* URINARY SYSTEM (in part)

Schmitt, Dr Waldo LaSalle *Research Associate, Department of Zoology, U.S National Museum, Smithsonian Institution* CRUSTACEA

Schneirla, Dr T C *Department of Animal Behavior, American Museum of Natural History* INSTINCTIVE BEHAVIOR

Schoenherr, Dr Karl Ernest *Technical Director, Hydromechanics Laboratory, David Taylor Model Basin, Washington, D C* CAVITATION

Schour, Dean Isaac *College of Dentistry, University of Illinois* TOOTH

Schrader, Prof Franz *Department of Zoology, Duke University* MITOSIS

Schrank, Dr A R *Department of Zoology, University of Texas* PLANT MOVEMENTS

Schroeder, Dr Charles Arthur *Department of Horticultural Science, University of California at Los Angeles* FRUIT (TREE), articles on various tree fruits

Schubert, Dr Jack *Division of Biological and Medical Research, Argonne National Laboratory* BERYLLIUM

Schule, John Joseph, Jr *Head, Applied Oceanography Branch, U.S Navy Hydrographic Office* HALOCLINE, TEXAS TOWERS, THERMOCLINE

Schulman, Dr James Herbert *Associate Superintendent, Solid State Division, U.S. Naval Research Laboratory* ELECTROLUMINESCENCE, LUMINESCENCE, other articles on luminescence and in theoretical physics (all co-authored).

Schutt, Dr. Hermann C. *Consulting Engineer.* FURNACE CONSTRUCTION

Shrock, Prof. Robert Rakes *Professor and Chairman, Department of Geology and Geophysics, Massachusetts Institute of Technology* EARTH SCIENCES

Shubik, Dr Philippe *Division of Oncology, Chicago Medical School* ONCOLOGY

Shuster, Dr. Carl Nathaniel, Jr. *Director, Marine Laboratories, Department of Biological Sciences, University of Delaware.* XIPHOSURA

Siegel, Prof Benjamin M *Department of Engineering Physics, Cornell University* MICROSCOPE, ELECTRON (in part).

Siegfried, Prof Laurance B *Professor emeritus of Graphic Arts and Chairman of Graphic Arts Department, School of Journalism, Syracuse University* PRINTING

Siever, Prof Raymond *Department of Geology, Harvard University* SEDIMENTARY ROCKS, SEDIMENTATION (GEOLOGY); series of articles on sedimentary rocks

Silliker, Dr John H *Associate Director of Research, Swift and Company* FOOD POISONING, BACTERIAL; FOOD SPOILAGE

Silver, Edward A *Professional Agricultural Engineer.* AGRICULTURAL SOIL AND CROP PRACTICES

Silver, Dr Seymour David *Scientific Director, U.S Army Chemical Warfare Laboratories* CHEMICAL WARFARE, GAS MASK, INCENDIARY, SCREENING SMOKE

Simons, Lt Col David G *Chief, Department of Bioastronautics, Randolph Air Force Base, Texas* SPACE FLIGHT

Simons, Dr Joseph H *University of Florida* FLUORINE

Simonson, Dr Roy W *Director, Soil Classification and Correlation Soil Survey, Soil Conservation Service, U.S Department of Agriculture* PEDOLOGY, SOIL (GREAT SOIL GROUPS)—in part

Simpson, Dr F J *Bacteriologist, National Research Council of Canada* LACTIC ACID

Simpson, Prof Stephen G *Associate Professor of Analytical Chemistry, Massachusetts Institute of Technology* BALANCE (ANALYTICAL), GRAVIMETRIC ANALYSIS, QUANTITATIVE CHEMICAL ANALYSIS

Sinclair, Dr Donald B *Executive Vice-President, General Radio Company* ELECTRIC POWER MEASUREMENT (in part), ELECTRICAL MEASUREMENTS (in part), IMPEDANCE MEASUREMENTS, HIGH-FREQUENCY, articles on electrical instrumentation

Singer, Prof S F *University of Maryland* SPACE (in part)

Singer, Dr Stanley *Head, Propulsion Department, Rocket Power, Division of The Gabriel Company* PROPELLANT (in part)

Sinnett, Chester Maxim. *Radio Corporation of America* TELEVISION RECEIVER (in part)

Sinnott, Dr Edmund *Sterling Professor emeritus of Botany, Dean emeritus of the Graduate School, Yale University* PLANT MORPHOGENESIS

Siple, Dr Paul Allman *The Scientific Advisor, U S Army Research Office* ANTARCTICA

Sipley, Dr Louis Walton *Director, American Museum of Photography* PRINTING PLATE (in part)

Sisler, Dr Harry Hall *Professor and Head, Department of Chemistry, University of Florida* AMMINE AMMONIA, NITROGEN

Sistrom, William R *Assistant Professor of Biology, Harvard University* BACTERIAL GROWTH, MYXOBACTERALES

Sittig, Marshall *Consultant.* ALKALI METALS, articles on individual alkali metals

Sittner, Dr. W R *Sperry Semiconductor Division, Sperry-Rand Corporation* INFRARED DETECTOR, PHOTODIODE, PHOTO-TRANSISTOR

Semmes, Dr. Josephine *Research Associate, Psychophysiological Laboratory, New York University, Bellevue Medical Center.* AGNOSIA; AMNESIA; APHASIA; APRAXIA; ASTEREOGNOSIS.

Serr, Prof. Eugene Frank, Jr. *Pomologist, University of California at Davis* NUT CROP CULTURE, articles on various nuts

Setlow, Prof Richard B *Biophysics Department, Yale University.* PHYSIOLOGICAL ACTION SPECTRA.

Seubold, Dr. Frank H. *Senior Chemist, Aerojet-General Corporation.* ANTIOXIDANT, INHIBITOR (CHEMICAL)

Shapiro, Hymin *Assistant Director of Chemical Research, Ethyl Corporation* LEAD (in part)

Sharpe, Dr C F. Stewart *221 Monroe Street, Falls Church, Virginia* LANDSLIDE, MASS WASTING, other articles in geology.

Sharvelle, Dr. Eric George *Department of Botany and Plant Pathology, Purdue University* FRUIT (TREE) DISEASES—in part

Sheard, Dr Keith *Senior Research Officer, Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Australia* INDIAN OCEAN (in part)

Shearer, Prof. J Lowen *Mechanical Engineering Department, Massachusetts Institute of Technology* MAGNETIC AMPLIFIER, SERVOMECHANISM, SYNCHRO

Sheffield, Dr Fred D *Associate Professor in Psychology, Yale University* EXTRASENSORY PERCEPTION (ESP)

Shellenberger, Dr John A *Department of Flour and Feed Milling Industries, Kansas State University* FOOD MANUFACTURING (in part); processing sections of various cereal grain articles

Shelton, Dr Frank H *Research Scientist, Kaman Nuclear, A Division of Kaman Aircraft Corporation* NUCLEAR EXPLOSION (in part)

Shepard, Prof Francis Parker *Scripps Institution of Oceanography, University of California* SUBMARINE CANYON

Sheppard, Dr Edith M *Senior Lecturer in Zoology, University College of South Wales and Monmouthshire, Cardiff, Wales* PHREATICOIDEA

Sheppard, Prof P A *Imperial College, London, England* METEOROLOGY (in part)

Sherwood, Robert S *Manager of Engineering, Steam Turbine Division, Worthington Corporation* MACHINERY, MASS PRODUCTION, MECHANICAL ENGINEERING, TECHNOLOGY

Shiino, Dr Prof Sueo M *Professor of Zoology, Faculty of Fisheries, Prefectural University of Mie, Japan* CALIGOIDA, EPICARIDEA

Shirley, Prof David Allen *Department of Chemistry, University of Tennessee* KETONE, articles on various ketones

Shive, Prof William *Department of Chemistry and the Clayton Foundation Biochemical Institute, University of Texas* ENZYME INHIBITION

Shnidman, Louis *Superintendent of Gas Production, Rochester Gas and Electric Corporation* FUEL GAS

Shomon, Dr Joseph James *Chief, Education Division, Commission of Game and Inland Fisheries, Editor, 'Virginia Wildlife'* WILDLIFE CONSERVATION

Shoop, Rue M *Vice-President, Publicity, Multi-amp Electronic Corp, Union, New Jersey.* ELECTRIC POWER SYSTEMS

Showalter, Albert Kenneth *Meteorologist, U.S Weather Bureau* WEATHER STATION

Shreve, Prof R. Norris *Purdue University* NITRATION (in part), UNIT PROCESSES

Shrock, Prof Robert Rakes *Professor and Chairman, Department of Geology and Geophysics, Massachusetts Institute of Technology* EARTH SCIENCES

Shubik, Dr. Philippe. *Division of Oncology, Chicago Medical School.* ONCOLOGY.

Shuster, Dr. Carl Nathaniel, Jr *Director, Marine Laboratories, Department of Biological Sciences, University of Delaware* XIPHOSURA

Siegel, Prof Benjamin M *Department of Engineering Physics, Cornell University* MICROSCOPE, ELECTRON (in part).

Siegfried, Prof Laurance B *Professor emeritus of Graphic Arts and Chairman of Graphic Arts Department, School of Journalism, Syracuse University* PRINTING

Siever, Prof Raymond *Department of Geology, Harvard University* SEDIMENTARY ROCKS, SEDIMENTATION (GEOLOGY), series of articles on sedimentary rocks

Silliker, Dr John H. *Associate Director of Research, Swift and Company* FOOD POISONING, BACTERIAL, FOOD SPOILAGE

Silver, Edward A *Professional Agricultural Engineer* AGRICULTURAL SOIL AND CROP PRACTICES

Silver, Dr Seymour David. *Scientific Director, U.S Army Chemical Warfare Laboratories* CHEMICAL WARFARE, GAS MASK, INCENDIARY, SCREENING SMOKE

Simons, Lt Col David G *Chief, Department of Bioastronautics, Randolph Air Force Base, Texas* SPACE FLIGHT

Simons, Dr. Joseph H. *University of Florida* FLUORINE

Simonson, Dr Roy W *Director, Soil Classification and Correlation Soil Survey, Soil Conservation Service, U.S Department of Agriculture* PEDOLOGY; SOIL (GREAT SOIL GROUPS)—in part

Simpson, Dr F J *Bacteriologist, National Research Council of Canada* LACTIC ACID

Simpson, Prof Stephen G *Associate Professor of Analytical Chemistry Massachusetts Institute of Technology* BALANCE (ANALYTICAL), GRAVIMETRIC ANALYSIS; QUANTITATIVE CHEMICAL ANALYSIS

Sinclair, Dr Donald B *Executive Vice P[illegible] Radio Company* ELE[illegible] Radio ELECTRICAL MEASUR[illegible]MENTS, HIGH-FREQUEN[illegible]

Singer, Prof S F. *University of Maryland* SPACE (in part).

Singer, Dr Stanley *Head, Propulsion Department, Rocket Power, Division of The Gabriel Company* PROPELLANT (in part)

Sinnett, Chester Maxim *Radio Corporation of America* TELEVISION RECEIVER (in part)

Sinnott, Dr Edmund *Sterling Professor emeritus of Botany, Dean emeritus of the Graduate School, Yale University* PLANT MORPHOGENESIS

Siple, Dr Paul Allman *The Scientific Advisor, U.S Army Research Office* ANTARCTICA

Sipley, Dr Louis Walton *Director, American Museum of Photography* PRINTING PLATE (in part)

Sisler, Dr Harry Hall *Professor and Head, Department of Chemistry, University of Florida* AMMINE, AMMONIA, NITROGEN

Sistrom, William R *Assistant Professor of Biology, Harvard University* BACTERIAL GROWTH, MYXOBACTERALES

Sittig, Marshall *Consultant* ALKALI METALS, articles on individual alkali metals

Sittner, Dr W R *Sperry Semiconductor Division, Sperry-Rand Corporation* INFRARED DETECTOR, PHOTODIODE, PHOTO-TRANSISTOR

Semmes, Dr Josephine *Research Associate, Psychophysiological Laboratory, New York University, Bellevue Medical Center* AGNOSIA, AMNESIA; APHASIA; APRAXIA, ASTEREOGNOSIS.

Serr, Prof. Eugene Frank, Jr. *Pomologist, University of California at Davis.* NUT CROP CULTURE; articles on various nuts

Setlow, Prof. Richard B *Biophysics Department, Yale University.* PHYSIOLOGICAL ACTION SPECTRA

Seubold, Dr. Frank H *Senior Chemist, Aerojet-General Corporation* ANTIOXIDANT; INHIBITOR (CHEMICAL).

Shapiro, Hymin *Assistant Director of Chemical Research, Ethyl Corporation.* LEAD (in part).

Sharpe, Dr. C. F Stewart. *221 Monroe Street, Falls Church, Virginia* LANDSLIDE, MASS WASTING, other articles in geology.

Sharvelle, Dr. Eric George. *Department of Botany and Plant Pathology, Purdue University.* FRUIT (TREE) DISEASES—in part.

Sheard, Dr. Keith *Senior Research Officer, Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Australia* INDIAN OCEAN (in part)

Shearer, Prof J Lowen *Mechanical Engineering Department, Massachusetts Institute of Technology* MAGNETIC AMPLIFIER, SERVOMECHANISM, SYNCHRO

Sheffield, Dr Fred D *Associate Professor in Psychology, Yale University* EXTRASENSORY PERCEPTION (ESP)

Shellenberger, Dr John A *Department of Flour and Feed Milling Industries, Kansas State University* FOOD MANUFACTURING (in part), processing sections of various cereal grain articles

Shelton, Dr Frank H *Research Scientist, Kaman Nuclear, A Division of Kaman Aircraft Corporation* NUCLEAR EXPLOSION (in part)

Shepard, Prof Francis Parker *Scripps Institution of Oceanography, University of California* SUBMARINE CANYON

Sheppard, Dr Edith M *Senior Lecturer in Zoology, University College of South Wales and Monmouthshire, Cardiff, Wales* PHREATICOIDEA

Sheppard, Prof P. A *Imperial College, London, England* METEOROLOGY (in part)

Sherwood, Robert S *Manager of Engineering, Steam Turbine Division, Worthington Corporation* MACHINERY, MASS PRODUCTION, MECHANICAL ENGINEERING, TECHNOLOGY

Shiino, Dr Prof Sueo M *Professor of Zoology, Faculty of Fisheries, Prefectural University of Mie, Japan* CALIGOIDA, EPICARIDEA

Shirley, Prof David Allen *Department of Chemistry, University of Tennessee* KETONE, articles on various ketones

Shive, Prof William *Department of Chemistry and the Clayton Foundation Biochemical Institute, University of Texas* ENZYME INHIBITION

Shnidman, Louis *Superintendent of Gas Production, Rochester Gas and Electric Corporation* FUEL GAS

Shomon, Dr Joseph James *Chief, Education Division, Commission of Game and Inland Fisheries, Editor, 'Virginia Wildlife'* WILDLIFE CONSERVATION

Shoop, Rue M *Vice-President, Publicity, Multi-amp Electronic Corp, Union, New Jersey* ELECTRIC POWER SYSTEMS

Showalter, Albert Kenneth *Meteorologist, U.S Weather Bureau* WEATHER STATION.

Shreve, Prof. R Norris *Purdue University* NITRATION (in part), UNIT PROCESSES.

Smythe, Dr William Ralph *Professor of Physics, California Institute of Technology* ELECTROMAGNETIC RADIATION; MAXWELL'S EQUATIONS; WAVE EQUATION, other articles on electromagnetic theory.

Snell, Dr Arthur Hawley. *Assistant Director, Oak Ridge National Laboratory; Director, Thermonuclear Project, Oak Ridge National Laboratory* NEUTRON; NEUTRON CROSS SECTION; NEUTRON, DELAYED, NEUTRON OPTICS

Snell, Prof. Esmond E *Professor of Biochemistry, University of California* BIOASSAY (in part).

Snell, Dr Fred M. *Professor of Biophysics, University of Buffalo School of Medicine.* OPEN SYSTEMS, THERMODYNAMICS OF (BIOLOGY).

Snodgrass, Frank E *Scripps Institute of Oceanography, University of California at La Jolla* OCEAN WAVES (in part)

Snodgrass, Dr Robert Evans. *Honorary Research Associate (retired), Smithsonian Institution* ARTHROPODA, ONYCHOPHORA

Snook, Dr Theodore *Professor of Anatomy, University of North Dakota School of Medicine* TONSIL.

Snyder, Dr Thomas Elliott *Research Associate, U.S National Museum, Smithsonian Institution* ISOPTERA

Soderberg, Adolph *Consulting Mining Engineer, Western Mining Divisions, Kennecott Copper Corporation* MINING, OPEN-CUT OR PIT

Sohon, Dr Harry *Moore School, University of Pennsylvania* INDUCTANCE MEASUREMENT, PHASE-ANGLE MEASUREMENT, articles on electrical instrumentation

Solitare, Dr Gilbert Bernard *Department of Pathology, Yale University School of Medicine* MUSCULAR SYSTEM DISORDERS.

Souders, Dr Mott *Director, Oil Development, Shell Development Company* FRACTIONATING COLUMN, FUEL OIL, PETROLEUM PRODUCTS, other articles in petroleum chemistry

Spackman, Dr. William *Department of Geology, Pennsylvania State University* COAL PALEOBOTANY

Spangenberg, Dr Karl Rudolph. *Consulting Engineer* DIODE, VACUUM, PENTODE, VACUUM, TRIODE, VACUUM, VACUUM TUBE, articles on other electronic tubes.

Spedding, Dr Frank Harold. *Professor of Chemistry and Physics, and Director, Institute for Atomic Research, Iowa State University, Director, Ames Laboratory of the Atomic Energy Commission* RARE-EARTH ELEMENTS, articles on various rare-earth elements

Spencer, Dr John Francis Theodore [illegible]

Spindt, Dr Roderick S *Gulf Research and Development Company* BURNING VELOCITY MEASUREMENT, COMBUSTION WAVE MEASUREMENT, SPECTROSCOPY OF COMBUSTION

Spink, Dr Wesley William *Professor of Medicine, University of Minnesota School of Medicine* BRUCELLOSIS

Spinrad, Dr Bernard I *Division Director, Reactor Engineering Division, Argonne National Laboratory* NUCLEONICS; REACTOR PHYSICS, THERMAL NEUTRONS

Sprague, Dr George Frederick. *Crops Research Division, Agricultural Research Service, U.S Department of Agriculture, Beltsville, Md* BREEDING (PLANT).

Sprague, Prof Howard B *Head, Agronomy Department, Pennsylvania State University* GRASS CROPS (in part), articles on various grasses

Skaar, Dr Christen *Associate Professor, College of Forestry, Syracuse University.* WOOD PHYSICS.

Skerman, Victor Bruce Darlington *Reader in Bacteriology and Head, Department of Bacteriology, University of Queensland, Australia.* BACTERIA, TAXONOMY OF, SCHIZOMYCETES, articles on related taxonomic groups

Skovholt, Dr Oscar. *Director of Laboratory, Quality Bakers of America Co-op, Inc* FOOD MANUFACTURING (in part)

Slabaugh, Dr. Wendell H. *Professor of Chemistry, Oregon State College.* INTERFACE OF PHASES; SURFACE-ACTIVE AGENT.

Slater, Lloyd Edward. *Executive Director, Foundation for Instrumentation Education and Research* FOOD ENGINEERING (in part).

Slawson, Prof. Chester Baker *Mineralogical Laboratory, University of Michigan* DIAMOND, GEM, MANUFACTURED.

Slaymaker, Frank H *Manager, Electroacoustics Laboratory, Research Division, Stromberg-Carlson Division, General Dynamics Corporation* PUBLIC ADDRESS SYSTEM, SOUND REPRODUCTION SYSTEMS, ELECTRICAL

Sleeper, Ruth *Director, School of Nursing and Nursing Service, Massachusetts General Hospital, Boston.* NURSING

Slichter, Dr Charles Pence *Professor of Physics, University of Illinois* MAGNETIC RELAXATION, MAGNETIC RESONANCE.

Slichter, Prof Louis B *Institute of Geophysics, University of California at Los Angeles* EARTH DEFORMATIONS AND VIBRATIONS, EARTH TIDES

Sloss, Prof L L *Department of Geology, Northwestern University* EVAPORITE (SALINE)

Smack, John C *Assistant to General Sales Manager, Curtiss Wright Corporation* METAL INSPECTION, ULTRASONIC

Smith, C Price *Manager, Kinescope Engineering, Radio Corporation of America* KINESCOPE

Smith, Prof David Martyn *Associate Professor of Silviculture, Yale University School of Forestry* SILVICULTURE

Smith, Dr F G Walton *Director, The Marine Laboratory, University of Miami* OCEANOGRAPHY (in part)

Smith, Fred W *Assistant to Apparatus Engineer, Western Union Telegraph Company* TELETYPEWRITER

Smith, Dr Guy D *Director, Soil Survey Investigations, Soil Conservation Service* SOIL (in part)

Smith, Dr Harold H *Department of Biology, Brookhaven National Laboratory* MENDELISM

Smith, Dr. Harry *Senior Principal Scientific Officer, Microbiological Research Establishment, Experimental Station, Wiltshire, England* ANTHRAX

Smith, Prof H T. U. *Head of Geology Department, University of Massachusetts* AERIAL PHOTOGRAPH

Smith, James A *Electric Utility Engineering, General Electric Company* ELECTRIC POWER SUBSTATION

Smith, Prof Karl Ulrich *Psychology Department, University of Wisconsin.* AUDIOMETRY, DEAFNESS, HEARING, LOUDNESS, PITCH.

Smith, Philip H *Contributing Editor, Society of Automotive Engineers* AUTOMOBILE; AUTOMOTIVE VEHICLE, series of related articles

Smith, Dr. Raymond Lloyd *Professor and Head, Department of Metallurgical Engineering, Michigan College of Mining and Technology* ZONE REFINING

Stephens, Dr Charles R. *Research Supervisor, Charles Pfizer and Company* OXYTETRACYCLINE.

Stephenson, Prof Richard M *University of Connecticut* ISOTOPE SEPARATION (STABLE ISOTOPES)

Stepniewski, Wieslaw Zenon *Assistant Director of Engineering, Research Vertol Division, Boeing Airplane Company.* CONVERTIPLANE.

Stern, Prof. Herbert *Botany Department, University of Illinois.* CELL PROTOPLAST

Stern, Joseph A *School of Fisheries, University of Washington* FOOD MANUFACTURING (in part).

Sterner, Dr John. *Vice-President, Cordis Corporation* LAUNCHING PAD COMPLEX.

Stevens, John E. *Chief of Space Mechanics, Astronautics Division, Chance Vought Aircraft, Inc* LANDING GEAR

Stevenson, Dr Robert E *Hancock Foundation, University of Southern California.* ESTUARINE OCEANOGRAPHY (in part)

Stewart, Dr David B *U.S Geological Survey* SILICATE PHASE EQUILIBRIA

Stewart, Dr Grace Anne *Geologist (retired)* DEVONIAN.

Stewart, Dr John Westcott *Department of Physics, University of Virginia* DIMENSIONAL ANALYSIS, ELECTRICAL STANDARDS; REFRACTION OF WAVES, series of articles in electricity

Stewart, Prof Wilson Nichols *Chairman, Department of Botany, University of Illinois* COAL BALLS, PTERIDOSPERMAE

Stiles, Dr R. Martin *Assistant Professor, Department of Chemistry, University of Michigan* TROPOLONE

Stillwell, Dr G Keith *Mayo Clinic, Mayo Foundation Graduate School of Medicine, University of Minnesota* THERMOTHERAPY (in part)

Stirton, Prof Ruben Arthur *Director, Museum of Paleontology, University of California.* MAMMALIA FOSSILS, articles on related fossil groups

Stoeckeler, Dr J H *Lake States Forest Experiment Station, University Farm, St Paul, Minnesota* FOREST SEEDING AND PLANTING

Stokes, Prof J L *Department of Bacteriology and Public Health, Washington State University* BACTERIAL NUTRITION

Stommel, Prof Henry M *Harvard University* GULF STREAM

Stone, Dr Kenneth G *Professor of Chemistry, Michigan State University* ORGANIC QUANTITATIVE ANALYSIS; REAGENT CHEMICALS STOICHIOMETRY, other articles in analytical chemistry

Stone, Prof Leon Stansfield *Bronson Professor of Comparative Anatomy, Yale University* BEHAVIOR, ONTOGENY OF, EYE, NERVOUS SYSTEM (all in part)

Storch, Dr Henry Herman. *Assistant Professor of Chemistry, New York University* COAL CHEMICALS, COAL GASIFICATION, FISCHER-TROPSCH PROCESS, related articles in chemical engineering

Storer, Prof Tracy I *Professor emeritus, Department of Zoology, University of California at Davis* Series of articles on various topics in zoology

Stotz, Prof Elmer H *University of Rochester School of Medicine and Dentistry* CYTOCHROME

Stover, Prof Harold Earl *Professor and Extension Agricultural Engineer, Kansas State University* RURAL SANITATION

Strachan, Dr Isles *Lecturer in Geology, University of Birmingham, England* GRAPTOLITHINA.

Strain, Dr Harold H *Senior Chemist, Argonne National Laboratory* CAROTENOID, CHROMATOGRAPHY

Spratt, Dr Nelson Tracy. *Chairman, Department of Zoology, University of Minnesota.* FETAL MEMBRANE; GASTRULATION, GERM LAYERS; articles on other fetal membranes.

Sprenkle, Raymond E *Director of Education, Bailey Meter Company.* ORIFICE; VENTURI TUBE.

Spurr, Prof. Stephen H *School of Natural Resources, University of Michigan.* ECOLOGY, APPLIED; FOREST ECOLOGY, FOREST MAPPING.

Squire, Prof. Charles Francis *Professor of Physics, The Rice Institute* ABSOLUTE ZERO; LOW-TEMPERATURE PHYSICS.

Srb, Prof, Adrian Morris *Department of Plant Breeding, Cornell University.* DOMINANCE, RECESSIVENESS, BLENDING.

Stadie, Dr William C *Maloney Clinic, University of Pennsylvania* LIPID METABOLISM

Stahnke, Dr. Herbert Ludwig *Head, Division of Life Sciences; Director, Poisonous Animals Research Laboratory; Professor of Zoology, Arizona State College* SCORPIONIDA.

Stakman, Dr. E. C. *Professor emeritus, University of Minnesota.* PLANT DISEASE; PLANT DISEASE CONTROL (both in part)

Standiford, Ferris Charles, Jr. *W L Badger Associates, Inc, Consulting Engineers* EVAPORATOR

Stansbury, Dr. Harry Adams, Jr. *Research Chemist, Union Carbide Chemicals Company.* ALDEHYDE, ACETALDEHYDE, BENZALDEHYDE; FORMALDEHYDE

Stapleton, Dr George Edward *Research Biologist, Radiation Biology Division, Oak Ridge National Laboratory* RADIATION MICROBIOLOGY

Stare, Prof Fredrick J *Department of Nutrition, Harvard University* NUTRITION

Starr, Eugene C *Chief Engineer, Bonneville Power Administration* ELECTRIC POWER GENERATION

Steacie, Dr E W R *President, National Research Council of Canada* FREE RADICAL

Stebbins, Prof G Ledyard *Department of Genetics, College of Agriculture, University of California at Davis* PLANT EVOLUTION

Steele, Dr. John Gordon *Chief, Soil Survey Reports, Soil Conservation Service, U.S Department of Agriculture, Beltsville, Md* SOIL (GREAT SOIL GROUPS)—in part

Steenrod, Prof Norman Earl *Professor of Mathematics, Princeton University.* FIBER BUNDLE

Steggerda, Prof F R *Professor of Physiology, University of Illinois* DIGESTIVE SYSTEM (in part)

Stehle, Prof. Philip McLellan *Professor of Physics, University of Pittsburgh.* CANONICAL TRANSFORMATIONS, HAMILTON'S EQUATIONS OF MOTION, LAGRANGE'S EQUATIONS, *other articles in* classical mechanics.

Steinberg, Prof. Arthur G. *Department of Biology, Western Reserve University.* HUMAN GENETICS (in part)

Steinberg, Dr. Daniel *Chief, Section on Metabolism, National Heart Institute* PROTEIN, articles on various proteins

Steinberg, Dr. Ellis Philip *Senior Chemist, Argonne National Laboratory.* NUCLEAR CHEMISTRY.

Steinert, Emil F. *Arc Welding Division, Westinghouse Electric Corporation* ARC WELDING.

Steinhaus, Prof. Edward A *Director, Laboratory of Insect Pathology, University of California.* INSECT CONTROL, BIOLOGICAL

Stephen, Dr A. C. *Formerly, Keeper, Natural History Department, Royal Scottish Museum, Edinburgh, Scotland.* ECHIUROIDEA, PRIAPULOIDEA

Stephens, Dr Charles R. *Research Supervisor, Charles Pfizer and Company* OXYTETRACYCLINE

Stephenson, Prof Richard M. *University of Connecticut* ISOTOPE SEPARATION (STABLE ISOTOPES).

Stepniewski, Wieslaw Zenon. *Assistant Director of Engineering, Research Vertol Division, Boeing Airplane Company* CONVERTIPLANE

Stern, Prof Herbert *Botany Department, University of Illinois* CELL PROTOPLAST.

Stern, Joseph A *School of Fisheries, University of Washington* FOOD MANUFACTURING (in part).

Sterner, Dr John *Vice-President, Cordis Corporation* LAUNCHING PAD COMPLEX

Stevens, John E *Chief of Space Mechanics, Astronautics Division, Chance Vought Aircraft, Inc.* LANDING GEAR

Stevenson, Dr Robert E *Hancock Foundation, University of Southern California* ESTUARINE OCEANOGRAPHY (in part)

Stewart, Dr David B *U S Geological Survey* SILICATE PHASE EQUILIBRIA

Stewart, Dr Grace Anne *Geologist (retired).* DEVONIAN.

Stewart, Dr John Westcott *Department of Physics, University of Virginia* DIMENSIONAL ANALYSIS, ELECTRICAL STANDARDS; REFRACTION OF WAVES, series of articles in electricity

Stewart, Prof. Wilson Nichols *Chairman, Department of Botany, University of Illinois* COAL BALLS; PTERIDOSPERMAE

Stiles, Dr R Martin *Assistant Professor, Department of Chemistry University of Michigan* TROPOLONE.

Stillwell, Dr G Keith *Mayo Clinic, Mayo Foundation Graduate School of Medicine, University of Minnesota* THERMOTHERAPY (in part)

Stirton, Prof Ruben Arthur *Director, Museum of Paleontology, University of California* MAMMALIA FOSSILS, articles on related fossil groups

Stoeckeler, Dr J H *Lake States Forest Experiment Station, University Farm, St. Paul, Minnesota* FOREST SEEDING AND PLANTING

Stokes, Prof. J L *Department of Bacteriology and Public Health, Washington State University* BACTERIAL NUTRITION.

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Stone, Dr Kenneth G *Professor of Chemistry, Michigan State University* ORGANIC QUANTITATIVE ANALYSIS, REAGENT CHEMICALS STOICHIOMETRY, other articles in analytical chemistry

Stone, Prof Leon Stansfield *Bronson Professor of Comparative Anatomy, Yale University* BEHAVIOR, ONTOGENY OF; EYE; NERVOUS SYSTEM (all in part)

Storch, Dr H. [illegible]

Sto[illegible] *Professor emeritus, Department of Zoology, University of California at Davis* Series of articles on various topics in zoology

Stotz, Prof Elmer H *University of Rochester School of Medicine and Dentistry* CYTOCHROME.

Stover, Prof Harold Earl *Professor and Extension Agricultural Engineer, Kansas State University* RURAL SANITATION

Strachan, Dr Isles *Lecturer in Geology, University of Birmingham, England* GRAPTOLITHINA

Strain, Dr Harold H *Senior Chemist, Argonne National Laboratory* CAROTENOID; CHROMATOGRAPHY

Strandberg, Prof. Malcom W. P. *Professor of Physics, Massachusetts Institute of Technology.* MICROWAVE SPECTROSCOPY

Strandtmann, Prof Russell William. *Texas Technological College.* MESOSTIGMATA (in part).

Stranks, Dr. Donald Richard *Senior Lecturer in Physical Chemistry, University of Melbourne, Australia* RADIOCHEMISTRY.

Straus, Dr. Reuben *Director of Laboratories and Research, Saint Joseph Hospital, Burbank, California.* CLINICAL PATHOLOGY.

Strausbaugh, Dr. P. D. *Professor emeritus of Botany, West Virginia University.* Series of articles in plant taxonomy.

Strayer, George Martin *Executive Vice-President and Secretary-Treasurer, American Soybean Association; Executive Director, Soybean Council of America, Inc* SOYBEAN (in part).

Streeter, Prof Victor L *University of Michigan* FLUID MECHANICS, PIPE FLOW; SOURCE FLOW, other articles in fluid mechanics

Strock, Clifford *Editor, 'Air Conditioning, Heating and Ventilating'* DEGREE-DAY

Stroke, Dr George W. *Massachusetts Institute of Technology* DOPPLER EFFECT, LIGHT

Stuart, Dr Edward G *Assistant Professor of Pathology, West Virginia Medical Center* Series of articles in anatomy and in human pathology

Stuart, Prof L C *Department of Zoology, University of Michigan* ZOOGEOGRAPHIC REGION, ZOOGEOGRAPHY

Stuart, William T *Editor, 'Electrical Construction and Maintenance,' McGraw-Hill Publishing Co* CONDUCTOR, ELECTRIC, CONNECTOR, ELECTRIC, WIRING (ELECTRIC), other articles on electric circuits

Stumm, Prof Erwin Charles *Department of Geology and Museum of Paleontology, University of Michigan* RUGOSA; TABULATA.

Stunkard, Dr Horace Wesley *Research Associate, Invertebrate Zoology, American Museum of Natural History* PARASITOLOGY

Sturges, Frank Caleb *Vice-President, Pennsylvania Drilling Company, President, Foundation Associates, Inc ; President, Lake Drilling Company, President, Diamond Products, Inc , President, Triangle Pump and Supply Company* BORING AND DRILLING, MINERAL, CORE DRILLING, WELL LOGGING (MINERAL)

Sturtevant, Prof Alfred H *Thomas Hunt Morgan Professor of Biology, California Institute of Technology* GENE, GENETICS

Sturtevant, George Rodger *Manager (retired), Engineering, Meter Department, General Electric Company* ELECTRIC ENERGY MEASUREMENT, WATT-HOUR METER

Suess, Prof Hans E *University of California at La Jolla* ELEMENTS (COSMIC ABUNDANCE)

Sully, Dr. Arthur H *Director, British Steel Castings Research Association, Sheffield, England* MANGANESE

Summerbell, Robert K *Professor of Chemistry, Northwestern University* DIOXANE, ETHER, ETHYLENE OXIDE

Summers, Dr Thomas Eugene *Agricultural Research Service, Crops Research Division, U S Department of Agriculture* ABACA, JUTE (in part), RAMIE (in part)

Suomi, Dr Verner E *Department of Meteorology, University of Wisconsin* METEOROLOGICAL INSTRUMENTATION, other articles on meteorological instrumentation

Suter, Dr. Hans H *Texaco, Calgary, Canada* MUD VOLCANO

Sutherland, J R *Large Power Transformer Engineering, General Electric Company* AUTOTRANSFORMER; TRANSFORMER (in part).

Sutton, George P *Chief Scientist, Advanced Research Projects Agency, U S Department of Defense* INTERPLANETARY PROPULSION, ROCKET, ROCKET ENGINE; ROCKET STAGING

Swanson, Prof Carl P. *Department of Biology, Johns Hopkins University* CHROMOSOME THEORY OF HEREDITY; MEIOSIS; RADIATION CYTOLOGY, SYNGAMY.

Swanson, Dr. Carroll Arthur *Professor of Botany, Ohio State University* PLANT TRANSLOCATION (ORGANIC SOLUTES).

Swern, Dr. Daniel *Research Supervisor, Eastern Regional Research Laboratory, U.S Department of Agriculture* HYDROXYLATION REACTION.

Switzer, Dr George *Curator, Division of Mineralogy and Petrology, Smithsonian Institution* CALICHE; NITER, NITRATE MINERALS, SODA NITER

Sylvester, Dr John Carl. *Director, Microbiologic Research Division, Abbott Laboratories* FUMAGILLIN

Tabor, Paul *Soil Conservation Service, U.S Department of Agriculture* COWPEA (in part). KUDZU, LEGUME FORAGES; LESPEDEZA, LUPINE

Tager, Prof Morris *Department of Bacteriology and Immunology, Emory University.* VIRULENCE

Tait, Dr John Barclay *Oceanographer, Marine Laboratory, Department of Agriculture and Fisheries for Scotland.* NORTH SEA

Tang, Prof K Y *Department of Electrical Engineering, Ohio State University* COUPLED CIRCUITS, NETWORK THEORY, ELECTRICAL, other articles on electric circuits

Tanner, Dr Fred W, Jr *Research Biochemist, Charles Pfizer and Company, Inc* CARBOMYCIN

Tarboux, Prof Joseph G. *Electrical Engineering Department, University of Michigan* RELAY.

Tattersall, Dr Olive Selden *Research Zoologist, Hayling Island, England* MYSIDACEA

Taube, Prof Henry *Department of Chemistry, University of Chicago* OXIDATION-REDUCTION

Taylor, Prof Angus Ellis *Chairman, Department of Mathematics, University of California at Los Angeles* CALCULUS, DIFFERENTIAL AND INTEGRAL, DIFFERENTIATION; PARAMETRIC EQUATION, PARTIAL DIFFERENTIATION

Taylor, Dr Gordon S *Tobacco Laboratory, Windsor, Connecticut* TOBACCO (in part)

Taylor, Prof J Herbert *Professor of Cell Biology, Columbia University* AUTORADIOGRAPHY, HISTORADIOGRAPHY, NUCLEAR RADIATION (BIOLOGY)—in part

Tedford, Dr Richard Hall *Assistant Professor of Geology, Division of Physical Sciences, University of California at Riverside* CARNIVORA FOSSILS, PERISSODACTYLA FOSSILS; articles on related fossil groups

Teleki, Prof Geza *Professor of Geology, George Washington University* EUROPE

Tenney, Dr Gerold H. *Los Alamos Scientific Laboratory, New Mexico* RADIOGRAPHY OF METALS

Thalmann, Prof Dr Hans Ernst *Visiting Professor of Paleontology, Stanford University (and University of Chile)* FORAMINIFERA FOSSILS.

Thoma, Dr Richard William. *The Squibb Institute for Medical Research* STEROID (in part)

Thoma, Roy Elliott, Jr *Research Chemist, Oak Ridge National Laboratory* FUSED-SALT PHASE EQUILIBRIA (in part).

Thomas, Dr Morgan David *Associate Professor of Geography, University of Washington* MINERAL RESOURCES CONSERVATION

Strandberg, Prof Malcom W. P. *Professor of Physics, Massachusetts Institute of Technology.* MICROWAVE SPECTROSCOPY.

Strandtmann, Prof. Russell William *Texas Technological College.* MESOSTIOMATA (in part).

Stranks, Dr. Donald Richard *Senior Lecturer in Physical Chemistry, University of Melbourne, Australia.* RADIOCHEMISTRY.

Straus, Dr Reuben *Director of Laboratories and Research, Saint Joseph Hospital, Burbank, California.* CLINICAL PATHOLOGY

Strausbaugh, Dr. P D *Professor emeritus of Botany, West Virginia University.* Series of articles in plant taxonomy.

Strayer, George Martin *Executive Vice-President and Secretary-Treasurer, American Soybean Association; Executive Director, Soybean Council of America, Inc.* SOYBEAN (in part)

Streeter, Prof Victor L. *University of Michigan.* FLUID MECHANICS, PIPE FLOW, SOURCE FLOW, other articles in fluid mechanics

Strock, Clifford *Editor, 'Air Conditioning, Heating and Ventilating'* DEGREE-DAY

Stroke, Dr George W *Massachusetts Institute of Technology* DOPPLER EFFECT, LIGHT

Stuart, Dr Edward G *Assistant Professor of Pathology, West Virginia Medical Center* Series of articles in anatomy and in human pathology

Stuart, Prof L C *Department of Zoology, University of Michigan* ZOOGEOGRAPHIC REGION, ZOOGEOGRAPHY

Stuart, William T *Editor, 'Electrical Construction and Maintenance,' McGraw-Hill Publishing Co* CONDUCTOR, ELECTRIC; CONNECTOR, ELECTRIC, WIRING (ELECTRIC), other articles on electric circuits

Stumm, Prof Erwin Charles *Department of Geology and Museum of Paleontology, University of Michigan* RUGOSA, TABULATA.

Stunkard, Dr Horace Wesley *Research Associate, Invertebrate Zoology, American Museum of Natural History* PARASITOLOGY

Sturges, Frank Caleb *Vice-President, Pennsylvania Drilling Company, President, Foundation Associates, Inc , President, Lake Drilling Company, President, Diamond Products, Inc., President, Triangle Pump and Supply Company* BORING AND DRILLING, MINERAL, CORE DRILLING, WELL LOGGING (MINERAL)

Sturtevant, Prof Alfred H *Thomas Hunt Morgan Professor of Biology, California Institute of Technology* GENE, GENETICS

Sturtevant, George Rodger *Manager (retired), Engineering, Meter Department, General Electric Company* ELECTRIC ENERGY MEASUREMENT, WATT-HOUR METER

Suess, Prof Hans E *University of California at La Jolla* ELEMENTS (COSMIC ABUNDANCE)

Sully, Dr Arthur H *Director, British Steel Castings Research Association, Sheffield, England* MANGANESE

Summerbell, Robert K *Professor of Chemistry, Northwestern University* DIOXANE, ETHER, ETHYLENE OXIDE

Summers, Dr Thomas Eugene *Agricultural Research Service, Crops Research Division, U.S Department of Agriculture* ABACA, JUTE (in part), RAMIE (in part)

Suomi, Dr Verner E *Department of Meteorology, University of Wisconsin* METEOROLOGICAL INSTRUMENTATION, other articles on meteorological instrumentation

Suter, Dr Hans H *Texaco, Calgary, Canada* MUD VOLCANO

Sutherland, J R *Large Power Transformer Engineering, General Electric Company* AUTOTRANSFORMER; TRANSFORMER (in part)

Sutton, George P *Chief Scientist, Advanced Research Projects Agency, U.S. Department of Defense* INTERPLANETARY PROPULSION; ROCKET; ROCKET ENGINE; ROCKET STAGING

Swanson, Prof. Carl P. *Department of Biology, Johns Hopkins University.* CHROMOSOME THEORY OF HEREDITY; MEIOSIS; RADIATION CYTOLOGY, SYNGAMY.

Swanson, Dr Carroll Arthur *Professor of Botany, Ohio State University* PLANT TRANSLOCATION (ORGANIC SOLUTES).

Swern, Dr Daniel *Research Supervisor, Eastern Regional Research Laboratory, U.S Department of Agriculture* HYDROXYLATION REACTION

Switzer, Dr George *Curator, Division of Mineralogy and Petrology, Smithsonian Institution* CALICHE; NITER, NITRATE MINERALS, SODA NITER

Sylvester, Dr. John Carl *Director, Microbiologic Research Division, Abbott Laboratories.* FUMAGILLIN

Tabor, Paul *Soil Conservation Service, U S Department of Agriculture* COWPEA (in part) KUDZU, LEGUME FORAGES, LESPEDEZA, LUPINE.

Tager, Prof Morris *Department of Bacteriology and Immunology, Emory University* VIRULENCE

Tait, Dr John Barclay *Oceanographer, Marine Laboratory, Department of Agriculture and Fisheries for Scotland* NORTH SEA.

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Tarboux, Prof Joseph G *Electrical Engineering Department, University of Michigan* RELAY

Tattersall, Dr Olive Selden. *Research Zoologist, Hayling Island, England* MYSIDACEA.

Taube, Prof Henry *Department of Chemistry, University of Chicago* OXIDATION-REDUCTION

Taylor, Prof Angus Ellis *Chairman, Department of Mathematics, University of California at Los Angeles* CALCULUS, DIFFERENTIAL AND INTEGRAL, DIFFERENTIATION, PARAMETRIC EQUATION, PARTIAL DIFFERENTIATION

Taylor, Dr Gordon S *Tobacco Laboratory, Windsor, Connecticut* TOBACCO (in part)

Taylor, Prof J Herbert *Professor of Cell Biology, Columbia University* AUTORADIOGRAPHY, HISTORADIOGRAPHY, NUCLEAR RADIATION (BIOLOGY)—in part

Tedford, Dr Richard Hall *Assistant Professor of Geology, Division of Physical Sciences, University of California at Riverside* CARNIVORA FOSSILS, PERISSODACTYLA FOSSILS, articles on related fossil groups

Teleki, Prof Geza. *Professor of Geology, George Washington University* EUROPE.

Tenney, Dr Gerold H *Los Alamos Scientific Laboratory, New Mexico* RADIOGRAPHY OF METALS

Thalmann, Prof Dr Hans Ernst *Visiting Professor of Paleontology, Stanford University (and University of Chile)* FORAMINIFERA FOSSILS.

Thoma, Dr Richard William *The Squibb Institute for Medical Research* STEROID (in part).

Thoma, Roy Elliott, Jr *Research Chemist, Oak Ridge National Laboratory* FUSED-SALT PHASE EQUILIBRIA (in part)

Thomas, Dr Morgan David *Associate Professor of Geography, University of Washington* MINERAL RESOURCES CONSERVATION

Thompson, Prof Gerald Luther *Associate Professor of Applied Mathematics and Industrial Administration, Graduate School of Industrial Administration, Carnegie Institute of Technology* GAME THEORY.

Thompson, Dr. M L *Principal Geologist, Illinois State Geological Survey.* FUSULINIDAE.

Thompson, Dr. Stanley Gerald *Senior Staff Member, Lawrence Radiation Laboratory, University of California* BERKELIUM; CALIFORNIUM, EINSTEINIUM; FERMIUM, MENDELEVIUM

Thomsen, Prof. John S *Mechanical Engineering Department, Johns Hopkins University.* ATOMIC CONSTANTS, X-UNIT (both in part)

Thomson, Dr Harry C *Formerly, Ordnance Historian, U.S Department of the Army* ARAMAMENT, ARMY

Thomson, Prof Robb Milton *Department of Metallurgy, University of Illinois* ALLOY STRUCTURES, CRYSTAL DEFECTS, GRAIN BOUNDARIES (METALLURGY), TWINNING (CRYSTALLOGRAPHY)

Thorne, Prof Gerald *Professor of Plant Pathology and Zoology, University of Wisconsin* DORYLAIMOIDEA

Thurston, Dr H David *Institute of Agriculture, University of Minnesota* PLANT DISEASE CONTROL, POTATO, IRISH; (both in part)

Thwaites, Fredrik Turville *Assistant Professor emeritus, Department of Geology, University of Wisconsin* GLACIATED TERRANE, articles on various glaciated formations

Tikofsky, Dr Ronald Sherwood *Speech Research Laboratory and Speech Clinic, University of Michigan* SPEECH (in part)

Tilton, Dr George Robert *Geophysical Laboratory, Carnegie Institution of Washington* LEAD ISOTOPES, GEOCHEMISTRY OF

Tippo, Dr Oswald *Provost, University of Colorado* STELE, WOOD (ANATOMY AND IDENTIFICATION)

Tobias, Prof Julian Morris *Department of Physiology, University of Chicago* BIOPOTENTIALS AND ELECTROPHYSIOLOGY, ELECTRODIAGNOSIS, ELECTROTHERAPY

Toensing, Dr Clarence H *Manager, Powder Metals Research, Firth Sterling, Inc* TUNGSTEN

Toland, Dr William G *Research Scientist, California Research Corporation* OXIDATION PROCESS

Tompkins, Prof Charles B *Department of Mathematics, University of California at Los Angeles* CALCULUS OF VARIATIONS

Torrey, Dr Theodore W *Department of Zoology, Indiana University* URINARY SYSTEM (in part)

Townes, Prof Charles Hard *Physics Department, Columbia University* MASER

Tracy, Dr Paul Hubert *Professor emeritus, University of Illinois* CASEIN, CHEESE (in part), ICE CREAM (in part), MILK (in part), RENNIN

Trauberman, Leonard *Engineer, The Technicon Company* FOOD ENGINEERING (in part)

Treffers, Prof Henry P *Professor of Microbiology, Yale University* IMMUNITY, SKIN TEST, series of articles in immunology

Treybal, Dr Robert E *Professor of Chemical Engineering, New York University* SOLVENT EXTRACTION

Troost, Prof Laurens *Professor and Head, Department of Naval Architecture and Marine Engineering, Massachusetts Institute of Technology* PROPELLER, MARINE

Trowbridge, Dr Arthur Carleton *Professor emeritus of Geology, State University of Iowa* COASTAL PLAIN.

Truax, Cmdr. Robert C *Bureau of Aeronautics, U.S. Department of the Navy* ASTRONAUTICAL ENGINEERING; ASTRONAUTICS, MISSILE

Trump, Prof John George *Massachusetts Institute of Technology.* IMPULSE GENERATOR

Truxal, Dr John G *Head, Electrical Engineering Department, Polytechnic Institute of Brooklyn* OPEN-LOOP CONTROL SYSTEM, TELEMETERING; articles on other control systems

Tsuchiya, Prof Henry M *Department of Chemical Engineering, University of Minnesota* DEXTRAN

Tuck, James L *Associate Division Leader, Los Alamos Scientific Laboratory, New Mexico* PINCH EFFECT

Tukey, Dr Harold Bradford *Head, Department of Horticulture, Michigan State University* Series of articles on various edible fruits

Tully, Dr John P *Pacific Oceanographic Group, Fisheries Research Board of Canada* ARCTIC OCEAN; NORTHWEST PASSAGE

Turekian, Dr Karl K. *Assistant Professor of Geology, Yale University* ELEMENTS (GEOCHEMICAL DISTRIBUTION)

Turnbull, Dr David *General Electric Research Laboratory* CRYSTAL GROWTH, other articles in crystallography.

Turner, Prof C Donnell *Professor of Biology, Duquesne University* Physiology section of each of the endocrine glands.

Turner, Dr Charles Wesley *Professor of Dairy Husbandry, University of Missouri* LACTATION, MAMMARY GLAND.

Turner, Prof Clesson N *Professor of Agricultural Engineering, Project Leader of New York Farm Electrification Council, Cornell University* RURAL ELECTRIFICATION

Turner, Dean Lewis *Utah State University* RANGE LAND CONSERVATION

Turner, Dr Richard J *Technical Director, American Cyanamid Company* FOLIC ACID (in part)

Turner, Dr Thomas B *Johns Hopkins University School of Medicine* SPIROCHETE, SYPHILIS, articles on various spirochetal infections

Turnwald, Wolfgang *Nordberg Manufacturing Company* STEAM, STEAM ENGINE.

Tuteur, Prof Franz B *Department of Electrical Engineering, Yale University* VIBRATOR

Tuttle, Alan H *Design Engineer, Worthington Corporation* LATHE MACHINING OPERATIONS WOODWORKING, articles on various machining operations

Tuttle, Dr W Norris *General Radio Company* DIGITAL VOLTMETER VACUUM-TUBE VOLTMETER

Tyler, Prof Albert *Division of Biology, California Institute of Technology* REPRODUCTION, ANIMAL series of related articles

Tyler, Ivan L *Research Counselor, Research and Development Laboratories Portland Cement Association* GROUT, GUNITE

Tyler, John E *Scripps Institution of Oceanography, University of California* SEA WATER (in part)

U

Uchida, Dr Tohru *Professor of Zoology, Hokkaido University, Japan* SCYPHOZOA articles on related taxonomic groups

Udy, Dr Marvin J *Strategic-Udy Processes, Inc, Engineers* CHROMIUM

Underwood, Prof Benton J *Northwestern University* VERBAL LEARNING

Upton, Dr Arthur Canfield *Biology Division Oak Ridge National Laboratory* RADIATION INJURY (BIOLOGY)

Usinger, Prof Robert Leslie. *University of California* HEMIPTERA

V

Valleau, Dr William Dorney *Distinguished Professor of Plant Pathology, University of Kentucky.* TOBACCO (in part).

Vallentyne, Prof John R. *Associate Professor of Zoology, Cornell University.* BIOSPHERE; BIOSPHERE, GEOCHEMISTRY OF.

Van Allen, Dr. J. A. *State University of Iowa.* VAN ALLEN RADIATION.

Van Andel, Dr. Tjeerd Hendrik *Scripps Institution of Oceanography, University of California* DELTA (in part); MARINE SEDIMENTS (in part)

Van Campenhout, Prof Ernest L *Professor of Anatomy, Histology, Embryology, University of Louvain School of Medicine, Belgium* PANCREAS (in part).

Van De Kamp, Dr Peter. *Professor of Astronomy; Director, Sproul Observatory, Swarthmore College* ASTROMETRY; PARALLAX (ASTRONOMY)

Van Dorn, Dr William G *Scripps Institution of Oceanography, University of California* TSUNAMI

Van Dyke, Prof John Howard *Professor of Anatomy Hahnemann Medical College* ULTIMOBRANCHIAL BODIES

Van Fleet, Dr D S *Head, Department of Botany, University of Massachusetts* CORTEX, PLANT, ENDODERMIS, HYPODERMIS

Van Niel, Dr. Cornelis B *Herzstein Professor of Biology, Hopkins Marine Station of Stanford University* BACTERIOLOGY, FERMENTATION, MICROBIOLOGY, RHODOBACTERIINEAE

Van Slyke, Dr Donald Dexter *Brookhaven National Laboratory* BIOCHEMISTRY

Van Wazer, Dr John R *Senior Scientist and Assistant Research Director, Monsanto Chemical Company* PHOSPHORUS

Van Winkle, Prof Quentin *Department of Chemistry, Ohio State University* ELECTROKINETIC PHENOMENA, other articles in colloidal chemistry

Vander Velde, Prof Wallace E *Massachusetts Institute of Technology* CYBERNETICS.

Vanderzee, Prof Cecil E *Department of Chemistry, University of Nebraska* COUNTERCURRENT MASS-TRANSFER OPERATION, EQUILIBRIUM, CHEMICAL

Vanick, James S *Consultant, Foundry-Castings* CAST IRON

Varner, Prof Joseph E *Agricultural Biochemistry, Ohio State University* PLANT METABOLISM

Vaughan, Dr Edward Kemp *Department of Botany and Plant Pathology, Oregon State College* CURRANT, RASPBERRY (both in part)

Vaughan, Virginius N, Jr *Data and Teletypewriter Planning Engineering, American Telephone and Telegraph Company* DATA TRANSMISSION, TELEGRAPHY (in part), TELETYPESETTER, TELETYPEWRITER EXCHANGE (TWX) SERVICE

Vaughan, Prof Wyman Ristine *Department of Chemistry, University of Michigan* ISOMERISM, MOLECULAR, OPTICAL ACTIVITY, STEREOCHEMISTRY, other articles in stereochemistry

Velick, Prof Sidney Frederick *Department of Biological Chemistry, Washington University School of Medicine* BIOLOGICAL OXIDATION

Vernon, Edward M *Chief of Forecast Division, U S Weather Bureau* WEATHER (FORECASTING AND PREDICTION)—in part

Verwey, Dr W. F *Professor and Chairman, Department of Microbiology, University of Texas Medical Branch* BIOLOGICALS, articles on infections caused by hemophilic bacteria

Ver Wiebe, Prof. Walter A *Professor of Petroleum Geology, University of Wichita* NATURAL GAS.

Vesper, Dr Harold Gould *Chemist, Shell Development Company* PETROCHEMICAL (in part).

Vestal, *Prof* Paul A *Rollins College*. Series of taxonomic articles on lower plant groups

Vestine, Dr Ernest Harry. *RAND Corporation* AERONOMY

Vidone, Dr. Romeo Albert *Instructor, Department of Pathology, Yale University School of Medicine* CIRCULATION DISORDERS; articles on various circulation disorders

Vierheller, Prof Albert Frank *Extension Horticulturist (retired), Professor of Horticulture, University of Maryland.* HORTICULTURAL CROPS

Vincent, Sydney Archibald *Consulting Naval Architect* SHIP, MERCHANT.

Vine, Allyn C. *Physical Oceanographer, Woods Hole Oceanographic Institution* BATHYTHERMOGRAPH, OCEAN CURRENTS (in part), SEA WATER (in part)

Vishniac, Dr Wolf. *Department of Microbiology, Yale University* THIOBACTERIACEAE

Voigt, Dr G K *Associate Professor of Forest Soils, School of Forestry, Yale University* FOREST SOIL, FOREST TREE NURSERY MANAGEMENT

Vokac, Charles W *Manager, Electric Arc Furnace Division, Whiting Corporation* ARC HEATING

Volk, Prof. Wesley A *Department of Microbiology, University of Virginia School of Medicine* BACTERIAL COENZYME, BACTERIAL ENZYME (both in part)

Vollum, Howard *President, Tektronix, Inc* OSCILLOSCOPE, CATHODE-RAY

von Doenhoff, Albert E *Staff Scientist, National Aeronautics and Space Administration* AIRFOIL, AIRFOIL PROFILE, ASPECT RATIO

Vonnegut, Dr Bernard *Arthur D Little, Inc* ATMOSPHERIC ELECTRICITY

Voss, Dr Gilbert L *Associate Professor of Marine Biology, The Marine Laboratory, University of Miami* CEPHALOPODA, articles on related taxonomic groups

W

Wackerman, Prof Albert E *Professor of Forest Utilization, Duke University School of Forestry* LOGGING (FORESTRY), LUMBER MANUFACTURE

Waddington, Dr Thomas Cudworth *University Demonstrator in Chemistry, University of Cambridge, England* Series of articles on various topics in chemistry

Waelsch, Prof Salome G *Albert Einstein College of Medicine, New York* MUTATION (ONTOGENY)

Wagner, Prof Dr Carl *Max Planck Institut für physikalische Chemie, Germany* LIESEGANG RINGS

Wagner, Dr Robert P *Professor of Zoology, University of Texas* GENE ACTION (in part)

Wahl, Dr Floyd Michael *Research Assistant Professor of Geology, University of Illinois* CLAY, CLAY MINERALS, articles on related minerals (all co-authored)

Wahlstrom, Prof Ernest Eugene *Professor of Geology, University of Colorado* PETROGRAPHY

Waidelich, Prof Donald L *Chairman, Department of Electrical Engineering, University of Missouri.* POWER SUPPLY, ELECTRONIC, RECTIFIER, VOLTAGE REGULATOR (in part), series of related articles

Waksman, Dr Selman Abraham *Professor emeritus, Institute of Microbiology, Rutgers University* ACTINOMYCETACEAE, ACTINOMYCETALES, NEOMYCIN, STREPTOMYCETACEAE, STREPTOMY-

Waldron, Dr Robert D *Research Scientist, The Garrett Corporation* DIELECTRIC CONSTANT; DIELECTRICS; series of related articles

Walker, Dr. Donald Gregory *Associate Professor of Anatomy, Johns Hopkins School of Medicine* SKELETAL SYSTEM (in part)

Walker, Dr Warren Franklin, Jr *Department of Zoology, Oberlin College* MUSCULAR SYSTEM (in part)

Wall, James Robert *Senior Scientist, Alcoa Research Laboratories, Aluminum Company of America* GALLIUM

Wallace, Dr James Merrill *Plant Pathologist, University of California Citrus Experiment Station* FRUIT (TREE) DISEASES (in part)

Walsh, Prof Joseph Leonard *Perkins Professor of Mathematics, Harvard University* COMPLEX NUMBERS AND COMPLEX VARIABLES, CONFORMAL MAPPING, LAPLACE'S DIFFERENTIAL EQUATION

Walsh, Dr Peter Joseph *Research Department, Lamp Division, Westinghouse Electric Corporation* HEAT RADIATION, series of related articles (all co-authored)

Walter, William C *Product Planning Manager, A V Roe Aeronautical Group, Ltd* AERODYNAMICS, AEROMECHANICS

Wang, Dr William S-Y *Research Associate, University of Michigan* SPEECH (in part)

Ware, Dr J O *College of Agriculture, University of Arkansas* COTTON (in part)

Warren, Prof Bertram E *Massachusetts Institute of Technology* X-RAY DIFFRACTION (in part)

Wartik, Prof Thomas *Pennsylvania State University* BORANE

Warwick, Dr James Walter *High Altitude Observatory, University of Colorado* ASTRONOMICAL GEOPHYSICS

Watkins, Dr Thomas D, Jr *Agricultural and Mechanical College of Texas* GOAT, MOHAIR, SHEEP, WOOL (in part)

Watson, Prof William W *Chairman, Department of Physics, Yale University* ATOMIC PHYSICS, AUGER EFFECT, MOLECULAR PHYSICS, NUCLEAR PHYSICS

Wattenberg, Ben *Formerly, Editor, 'Rivers and Harbors.' Presently, Editor-Publisher, 'Leisure'* HARBOR, INLAND WATERWAYS TRANSPORTATION

Watterson, Dr Ray L *Chairman, Department of Biological Sciences, Northwestern University* BLASTULATION, CLEAVAGE, EMBRYONIC

Weaver, Dr E Eugene *Associate Professor of Chemistry, Wabash College* Series of articles on various topics in chemistry

Weaver, James L *Formerly, Electron Tube Division, Radio Corporation of America* PHOTOTUBE, PHOTOTUBE, MULTIPLIER

Weaver, Prof Paul *Professor (retired), Agricultural and Mechanical College of Texas* OIL-FIELD MODEL

Weaver, S E *Northrop Aircraft, Inc* DRONE, PARACHUTE

Webb, Prof J E *Professor of Zoology, University College, Ibadan, Nigeria* CEPHALOCHORDATA

Weber, David C *Assistant Director, Harvard University Library* PHOTOCOPYING PROCESSES

Weber, Erwin L *Consulting Engineer* HOT-WATER HEATING SYSTEM, PANEL HEATING AND COOLING, RADIANT HEATING, RADIATOR

Weber, Prof Harold Christian *Professor of Chemical Engineering, Massachusetts Institute of Technology* ENTHALPY, ENTROPY, HEAT CAPACITY; series of related articles

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Weeks, Lewis George *Geological Consultant* MINERAL FUEL AREAS

Weeks, Dr Owen B *Professor of Bacteriology, University of Idaho* ACHROMOBACTERACEAE

Wehe, Herman G *Bell Telephone Laboratories, Inc* METAL COATINGS (in part)

Wehr, Dr Everett Elmer *Principal Parasitologist, Animal Disease and Parasite Research Division, Agricultural Research Service, US Department of Agriculture, Beltsville, Md* FILARIOIDEA.

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Weichert, Prof Charles Kipp *Professor of Zoology and Dean, College of Arts and Sciences, University of Cincinnati* CARDIOVASCULAR SYSTEM, REPRODUCTIVE SYSTEM; URINARY SYSTEM (all in part)

Weil, Dr Alfred Julius *Director, Department of Bacteriology, The Bronx Hospital* Series of articles on enteric bacteria

Weil, Prof Robert T, Jr *Department of Electrical Engineering, Manhattan College* DIRECT-CURRENT GENERATOR, MAGNETO

Weinman, Dr David *Associate Professor of Microbiology, Yale University* PARASITOLOGY, MEDICAL, series of articles on parasitic infections

Weinstein, Dr Marvin Joseph *Senior Microbiologist, Schering Corporation* GRISEOFULVIN

Weissman, Prof S I *Washington University* ELECTRON PARAMAGNETIC RESONANCE SPECTROSCOPY

Welch, Dr Harold E *Nematode Section, Entomology Research Institute for Biological Control, Canada Department of Agriculture* Series of articles on taxonomic groups of nematodes

Weller, Dr J Marvin *Department of Geology, University of Chicago* CYCLOTHEM, VARVE

Wellman, Dr Frederick Lovejoy *Head, Department of Plant Pathology and Botany, Agricultural Experiment Station, University of Puerto Rico* CACAO (in part)

Wellner, Daniel *Department of Biochemistry, Tufts University School of Medicine* ENZYME (in part)

Wells, Prof John W *Department of Geology, Cornell University.* COELENTERATA FOSSILS, SCLERACTINIA FOSSILS

Wells, Prof Lemen J *Professor of Anatomy, University of Minnesota* REPRODUCTIVE SYSTEM (in part)

Wendlandt, Dr Wesley W *Professor of Chemistry, Texas Technological College* CARBON, CHEMICAL SYMBOLS AND FORMULAS, MANGANESE COMPOUNDS, other articles in inorganic chemistry

Wengerd, Dr Sherman A *Professor of Geology, University of New Mexico* BIOHERM, BIOSTROME, STROMATOLITE

Wenkert, Prof Ernest *Department of Chemistry, Iowa State University* STERIC EFFECT (CHEMICAL REACTION)

Went, Dr Frits Warmolt *Director, Missouri Botanical Garden* PLANT GROWTH

Wentworth, John W *Manager, Educational Electronics, Radio Corporation of America* TELEVISION RECEIVER (in part)

Werbin, I Vernon *Licensed Professional Engineer and Attorney* ENGINEERING AND ARCHITECTURAL CONTRACTS

West, Dr William *Eastman Kodak Company* ABSORPTION (ELECTROMAGNETIC RADIATION), DISPERSION (RADIATION)

Waldron, Dr Robert D *Research Scientist, The Garrett Corporation* DIELECTRIC CONSTANT, DIELECTRICS, series of related articles

Walker, Dr Donald Gregory *Associate Professor of Anatomy, Johns Hopkins School of Medicine.* SKELETAL SYSTEM (in part).

Walker, Dr Warren Franklin, Jr *Department of Zoology, Oberlin College* MUSCULAR SYSTEM (in part)

Wall, James Robert *Senior Scientist, Alcoa Research Laboratories, Aluminum Company of America* GALLIUM

Wallace, Dr James Merrill *Plant Pathologist, University of California Citrus Experiment Station* FRUIT (TREE) DISEASES (in part).

Walsh, Prof Joseph Leonard *Perkins Professor of Mathematics, Harvard University* COMPLEX NUMBERS AND COMPLEX VARIABLES, CONFORMAL MAPPING, LAPLACE'S DIFFERENTIAL EQUATION.

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Ware, Dr J O *College of Agriculture, University of Arkansas* COTTON (in part)

Warren, Prof Bertram E *Massachusetts Institute of Technology* X-RAY DIFFRACTION (in part)

Wartik, Prof Thomas *Pennsylvania State University* BORANE

Warwick, Dr James Walter *High Altitude Observatory, University of Colorado* ASTRONOMICAL GEOPHYSICS

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Weaver, Prof Paul *Professor (retired), Agricultural and Mechanical College of Texas* OIL-FIELD MODEL

Weaver, S E *Northrop Aircraft, Inc* DRONE PARACHUTE

Webb, Prof J E *Professor of Zoology, University College, Ibadan, Nigeria* CEPHALOCHORDATA

Weber, David C *Assistant Director, Harvard University Library* PHOTOCOPYING PROCESSES

Weber, Erwin L *Consulting Engineer* HOT-WATER HEATING SYSTEM, PANEL HEATING AND COOLING, RADIANT HEATING, RADIATOR

Weber, Prof Harold Christian. *Professor of Chemical Engineering, Massachusetts Institute of Technology* ENTHALPY, ENTROPY, HEAT CAPACITY, series of related articles

Weckel, Dr Kenneth Granville *Department of Dairy and Food Industries, University of Wisconsin* VITAMIN D (in part).

Weeks, Lewis George *Geological Consultant,* MINERAL FUEL AREAS

Weeks, Dr Owen B *Professor of Bacteriology, University of Idaho* ACHROMOBACTERACEAE

Wehe, Herman G *Bell Telephone Laboratories, Inc* METAL COATINGS (in part)

Wehr, Dr Everett Elmer *Principal Parasitologist, Animal Disease and Parasite Research Division, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Md* FILARIOIDEA

Weibel, Dr Ewald Rudolf *Research Fellow, Department of Pathology, Yale University School of Medicine* RESPIRATORY SYSTEM DISORDERS, articles on various respiratory disorders

Weichert, Prof Charles Kipp *Professor of Zoology and Dean, College of Arts and Sciences, University of Cincinnati* CARDIOVASCULAR SYSTEM, REPRODUCTIVE SYSTEM, URINARY SYSTEM (all in part)

Weil, Dr Alfred Julius *Director, Department of Bacteriology, The Bronx Hospital* Series of articles on enteric bacteria

Weil, Prof Robert T, Jr *Department of Electrical Engineering, Manhattan College* DIRECT-CURRENT GENERATOR, MAGNETO

Weinman, Dr David *Associate Professor of Microbiology, Yale University* PARASITOLOGY, MEDICAL, series of articles on parasitic infections

Weinstein, Dr Marvin Joseph *Senior Microbiologist, Schering Corporation* GRISEOFULVIN

Weissman, Prof S I *Washington University* ELECTRON PARAMAGNETIC RESONANCE SPECTROSCOPY

Welch, Dr Harold E *Nematode Section Entomology Research Institute for Biological Control, Canada Department of Agriculture* Series of articles on taxonomic groups of nematodes

Weller, Dr J Marvin *Department of Geology, University of Chicago* CYCLOTHEM, VARVE

Wellman, Dr Frederick Lovejoy *Head, Department of Plant Pathology and Botany, Agricultural Experiment Station, University of Puerto Rico* CACAO (in part)

Wellner, Daniel *Department of Biochemistry, Tufts University School of Medicine* ENZYME (in part)

Wells, Prof John W *Department of Geology, Cornell University* COELENTERATA FOSSILS, SCLERACTINIA FOSSILS

Wells, Prof Lemen J *Professor of Anatomy, University of Minnesota* REPRODUCTIVE SYSTEM (in part)

Wendlandt, Dr Wesley W *Professor of Chemistry, Texas Technological College* CARBON, CHEMICAL SYMBOLS AND FORMULAS, MANGANESE COMPOUNDS, other articles in inorganic chemistry

Wengerd, Dr Sherman A *Professor of Geology, University of New Mexico* BIOHERM, BIOSTROME, STROMATOLITE

Wenkert, Prof Ernest *Department of Chemistry, Iowa State University* STERIC EFFECT (CHEMICAL REACTION)

Went, Dr Frits Warmolt *Director, Missouri Botanical Garden* PLANT GROWTH

Wentworth, John W *Manager, Educational Electronics, Radio Corporation of America* TELEVISION RECEIVER (in part)

Werbin, I Vernon *Licensed Professional Engineer and Attorney* ENGINEERING AND ARCHITECTURAL CONTRACTS

West, Dr William *Eastman Kodak Company* ABSORPTION (ELECTROMAGNETIC RADIATION), DISPERSION (RADIATION)

Wetmore, Dr Alexander *Research Associate, Smithsonian Institution* ARCHAEORNITHES (in part); AVES FOSSILS, HESPERORNIS, ICHTHYORNIS

Wever, Prof Ernest Glen. *Department of Psychology, Princeton University.* PHONORECEPTION

Wexler, Dr Harry *Director of Research, U S. Weather Bureau* POLAR METEOROLOGY.

Wharton, Dr. G W *Professor and Head, Department of Zoology, University of Maryland* ACARINA

Wheeler, Prof. John Archibald *Palmer Physical Laboratory, Princeton University.* ATOMIC BOMB; CHAIN REACTION, NUCLEAR, CRITICAL MASS, FISSION, NUCLEAR.

Whinnery, Prof John R *Dean, College of Engineering, University of California.* BACKWARD-WAVE TUBE, KLYSTRON, MAGNETRON, MICROWAVE TUBE, TRAVELING-WAVE TUBE

Whistler, Prof Roy Lester *Department of Biochemistry, Purdue University* Series of articles on carbohydrates and their derivaties (all co-authored)

Whitcomb, Dr Richard T. *Head, 8-Foot Wind Tunnels Branch, Langley Research Center, National Aeronautics and Space Administration.* AERODYNAMIC WAVE DRAG, TRANSONIC FLIGHT

White, Dr C Langdon *Professor of Geography, Stanford University* SOUTH AMERICA

White, Prof. Colin *Department of Public Health, Yale University School of Medicine* EPIDEMIOLOGY, series of articles in epidemiology

White, Dr T A *Technical Director for Foods, National Starch and Chemical Corporation* STARCH.

Whitehead, Prof W Dexter. *Department of Physics, University of Virginia* MEAN FREE PATH

Whitney, Dr Roy P *Dean and Vice-President, The Institute of Paper Chemistry* PAPER AND PAPER PRODUCTS

Whittaker, Dr Robert H *Assistant Professor of Biology, Brooklyn College* BIOTIC ISOLATION, ECOSYSTEM, TERRITORIALITY

Whittington, Prof Harry B *Professor of Geology, Harvard University.* TRILOBITA

Widder, Prof David Vernon *Harvard University* INTEGRAL TRANSFORM, LAPLACE TRANSFORM

Wiens, Prof Herold J *Department of Geography, Yale University* ASIA

Wiesman, Clarence K *General Manager, Food Research and Quality Control Division, Armour and Company* FOOD ENGINEERING, FOOD MANUFACTURING (both in part)

Wightman, Prof. Arthur Strong *Professor of Mathematical Physics, Princeton University* GROUP THEORY

Wildhack, William A *Special Assistant to the Director, National Bureau of Standards* INSTRUMENTATION, PHYSICAL MEASUREMENT, VERNIER

Wilhelm, Dr. Harley A *Associate Director, Institute for Atomic Research and Ames Laboratory of U.S Atomic Energy Commission* THORIUM, URANIUM METALLURGY

Wilke, Prof. Charles R. *Department of Chemical Engineering, University of California* DIFFUSION IN GASES AND LIQUIDS, MASS-TRANSFER OPERATION.

Wilkinson, Prof. Denys Haigh *University of Oxford, England* BINDING ENERGY, NUCLEAR (in part); NUCLEAR STRUCTURE, POTENTIAL BARRIER

Wilkinson, Dr. Michael K. *Research Physicist, Oak Ridge National Laboratory* NEUTRON DIFFRACTION

Wilkinson, Roger I *Traffic Studies Engineer, Bell Telephone Laboratories, Inc* COMMUNICATIONS SYSTEM (TRAFFIC) DESIGN.

Willett, Prof. H C *Department of Meteorology, Massachusetts Institute of Technology* AIR MASS

Williams, Dr Dean N *Battelle Memorial Institute* LEAD ALLOYS.

Williams, Prof Dudley. *Department of Physics, Ohio State University.* MEASURE, UNITS, SYSTEMS OF; series of articles in physics

Williams, Prof Everard Mott *Carnegie Institute of Technology* COAXIAL CABLE

Wilson, Prof. E Bright, Jr *Theodore William Richards Professor of Chemistry, Harvard University* CHEMICAL BINDING

Wilson, Prof J Walter *Department of Biology, Brown University* LIVER (in part)

Wilson, Dr John Tuzo *Professor of Geophysics, Department of Physics, University of Toronto, Canada.* TECTONOPHYSICS, WARPING, EARTH CRUST

Wilson, Dr Leonard Richard *Professor of Geology, University of Oklahoma, Geologist IV, Oklahoma Geological Survey* PALYNOLOGY

Wilson, Dr Morley E *Geological Survey of Canada (retired).* ARCHEOZOIC, BASEMENT ROCK, PRECAMBRIAN, PROTEROZOIC.

Winch, Prof Ralph P *Barclay Jermain Professor of Natural Philosophy, Williams College* CAPACITANCE, ELECTROSTATICS, MAGNET, other articles on electrostatics and magnetostatics

Winding, Dr Charles C *School of Chemical and Metallurgical Engineering, Cornell University* PLASTICS FABRICATION

Winger, Dr Alvin G *Resinous Products Division, Rohm and Haas Company* ION-PERMEABLE MEMBRANE

Winkler, Dr Eva M *U S Naval Ordnance Laboratory* SHOCK-WAVE DISPLAY

Winograd, Harold *Consulting Engineer, Allis Chalmers Manufacturing Company* SEMICONDUCTOR RECTIFIER

Winterkorn, Dr Hans F *Professor of Civil Engineering, Princeton University* SOIL MECHANICS

Wirtv, Henry J *Chief Application Engineer, Hydraulic Division, Twin Disc Clutch Company* FLUID COUPLING, TORQUE CONVERTER

Wise, Edmund Merriman *Assistant to Vice-President, Research, The International Nickel Company, Inc* GOLD ALLOYS, SILVER ALLOYS

Wislicenus, Dr George F *Director, Garfield Thomas Water Tunnel, Ordnance Research Laboratory, Pennsylvania State University* WATER TUNNEL

Withington, Sidney *Chief Electrical Engineer (retired), New York, New Haven and Hartford Railroad* REPULSION MOTOR, UNIVERSAL MOTOR

Wolfe, Dr Ralph Stoner *Department of Microbiology, University of Illinois* CAULOBACTERIACEAE, SIDEROCAPSACEAE

Wolferz, Alfred H *Tachometer Development Director (retired), Weston Instruments* TACHOMETER

Wolff, Bertram *H Wolff Book Manufacturing Company* BOOK MANUFACTURE

Wonders, Dr William C. *Professor and Head, Department of Geography, University of Alberta, Canada* ARCTIC AND SUB-ARCTIC ISLANDS

Wood, Prof Earl Howard *Mayo Foundation, University of Minnesota and Mayo Clinic* OXIMETRY

Wood, Dr Ivan Daley *Consulting Engineer* IRRIGATION OF CROPS

Woodall, James E *Division Manufacturing Manager, Lamp Division, Westinghouse Electric Corporation* PILOT PRODUCTION

Woodbury, Dr. Angus M. *Professor emeritus, Ecological Research, University of Utah.* ANIMAL COMMUNITY

Woodcock, Alfred Herbert *Oceanographer, Woods Hole Oceanographic Institution* SEA WATER (in part).

Woodroof, Dr Jasper Guy *Chairman, Division Food Processing, University of Georgia* PEANUT (in part)

Woods, Prof John M *School of Chemical Engineering, Purdue University* ESTERIFICATION, TRANSESTERIFICATION

Wooley, Prof John C. *Professor emeritus, University of Missouri* AGRICULTURE (STRUCTURES)

Wooster, Dr Warren S *Research Oceanographer, Scripps Institution of Oceanography, University of California* SEA WATER (in part) •

Worchel, Prof Philip *Professor of Psychology, University of Texas* BLINDNESS

Work, Dr. Lincoln T *Consulting Engineer* SIZE REDUCTION

Worthington, Lawrence Valentine *Woods Hole Oceanographic Institution* SARGASSO SEA, CARIBBEAN SEA

Wright, Rear Admiral Edward Alvey *Commanding Officer and Director, David Taylor Model Basin, Washington, D C* WAKE (SEAGOING VESSELS)

Wright, Elliott Francis *Chief Engineer, Pump Developments, Worthington Corporation* CENTRIFUGAL PUMP DISPLACEMENT PUMP, PUMP, PUMPING MACHINERY

Wulff, Dr Verner J *Masonic Research Laboratory* PHOTORECEPTION (in part)

Wyrtki, Dr Klaus *Senior Research Officer, Division of Fisheries and Oceanography, Australia* SOUTHEAST ASIAN WATERS

Y

Yamada, Dr Prof Tuneo *Department of Biology, Nagoya University, Japan* EMBRYONIC INDUCTION, EMBRYONIC ORGANIZER, FATE MAPS, EMBRYONIC

Yeatman, Dr Harry C *Associate Professor of Biology, University of the South* CYCLOPOIDS

Yochelson, Dr Ellis Leon *U S Geological Survey* CONICONCHIA CONULARIDA, GASTROPODA FOSSILS MONOPLACOPHORA

Yoke, Dr John Thomas, III *Department of Chemistry, University of Arizona* SOAP AND DETERGENT

Yosim, Dr Samuel J *Supervisor, Inorganic Chemistry, Atomics International, A Division of North American Aviation* BISMUTH

Yost, Prof Don C M L *Professor of Inorganic Chemistry, California Institute of Technology* QUATERNIONS

Young, Dr David A *Department of Entomology, North Carolina State College* HOMOPTERA

Young, Edward M., Jr *Associate Editor, 'Engineering News-Record'* Series of articles on earth-moving machinery

Young, Dr James R *Mead Johnson Research Laboratory* GUM (in part).

Young, Prof Paul Thomas *Department of Psychology, University of Illinois* MOTIVATION

Young, Dr. Robert William *Consultant in Acoustics, U.S Navy Electronics Laboratory.* MUSICAL ACOUSTICS, MUSICAL INSTRUMENTS, series of related articles

Young, Dr Roland S *Consulting Chemical Engineer, Canad* COBALT.

Young, Dr Thomas Fraser *Professor of Chemistry, University of Chicago* EQUILIBRIUM, IONIC; HYDROLYSIS, series of related articles

Yu, Dr Ching-Sung *Professor of Astronomy, Hood College; Director, Williams Observatory* CONSTELLATION; articles on various constellations

Zabin, Irving *Associate Professor, Department of Physiological Chemistry, University of California School of Medicine* CHOLESTEROL, ERGOSTEROL, STEROID (in part); STEROL

Zacharias, Dr Jerrold Reinach *Professor of Physics, Massachusetts Institute of Technology* ATOMIC CLOCK.

Zangerl, Dr Rainer *Curator of Fossil Reptiles, Chicago Natural History Museum* EURYAPSIDA, PROTOROSAURIA, SAUROPTERYGIA

Zaumeyer, Dr William John *Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Md* BEAN (in part)

Ziemba, John V *Midwest Editor, 'Food Engineering'* FOOD ENGINEERING (in part)

Zimmerman, Prof Arnold A. *Department of Anatomy, Baylor College of Medicine, Texas Medical Center* LYMPHATIC SYSTEM (in part)

Zirkle, Prof Raymond E *Professor of Biophysics, University of Chicago* LINEAR ENERGY TRANSFER (BIOLOGY)

Zuk, Dr William *University of Virginia* CREEP OF MATERIALS, PHOTOELASTICITY

Zweifel, Dr Richard George *Assistant Curator of Amphibians and Reptiles, American Museum of Natural History* AMPHIBIA series of articles on related taxonomic groups

Zwilling, Prof Edgar *Brandeis University* TERATOGENESIS

How to use the Index

The purpose of the index is to help the user find specific information. To this end, an index entry has been made for every term discussed in the encyclopedia

Entries are specific rather than general The entries under "Chemistry" and "Chemical engineering" refer to the subject as a whole Specific chemical compounds, elements, and processes related to chemistry or chemical engineering are indexed under their own names, often with analytical subentries or cross references to related subjects.

In general, an index entry is a scientific or technological term rather than a common synonym For example, Phototube rather than Electric eye, *Drosophila melanogaster* rather than Fruit fly

An entry is made for a spelled-out form rather than an abbreviation Cross references have been made from common abbreviations, for example "AC *see* Alternating current" and "DNA *see* Deoxyribonucleic acid"

In chemical compounds with prefixes, the prefixes are disregarded *N*-benzoylglycine is under Benzoylglycine, beta sulfur under Sulfur.

The alphabetical arrangement is library style, word by word, rather than dictionary style in which the division of words is disregarded. Hyphenated words are arranged as separate words, so that Direct current is followed by Direct-current ammeter.

Volume numbers are given in boldface, followed by page numbers referred to in that volume. Thus "**4** 48-50, **12** 136-140" indicates pages in volumes 4 and 12

The main discussion of a subject is indicated by an asterisk (*) after the page number on which the discussion is to be found, so that **12** 151, 161-164* locates the main discussion on pages 161 to 164

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McGRAW HILL ENCYCLOPEDIA OF SCIENCE AND TECHNOLOGY

Topical Index

Preface

The topical index that follows groups the 7,224 articles in the Encyclopedia under nearly a hundred general headings. These listings give some indication of the great fund of information to be found in the more than 9,000 pages of the Encyclopedia. They will enable the interested reader to find quickly the articles in an area of science or technology in which he is seeking knowledge. For example, he will find titles of articles dealing with astronomy listed under the heading Astronomy, of articles dealing with microbiology under Microbiology, and so on.

The listings will be found to be useful in many ways. They will assist the reader who desires a thorough grounding in any subject covered in the Encyclopedia. If he is interested in acoustics, for example, he can turn to the list under that heading. Then, by studying all the articles listed there, he can significantly increase his knowledge of the subject. The Encyclopedia offers a broader and more up to date coverage of many scientific and technological subjects than will be found in most textbooks.

The listings will help the student engaged in research by providing further information on some aspect of a subject. It will be easy for him to find the articles related to his research activities by simply selecting the pertinent titles given under the general heading.

For a considerably more detailed listing, which goes well beyond article titles, the reader should refer to the 100,000-entry comprehensive index which fills 434 pages of Volume 15. The comprehensive index entries are specific, rather than general as in the topical index.

Actually, there are five approaches by which the student can find information in the encyclopedia.

1. The alphabetical placement by title of articles in the Encyclopedia.
2. The comprehensive index.
3. The topical index.
4. The 40,000 cross references among articles.
5. The list of contributors in Volume 15 which shows the major articles written by each contributor.

Using the listings

The lists can be used in various ways, depending on the desired goal. A reader seeking information on a general subject, for example, might not be interested in all of the articles in a list. There are approximately 100 articles listed under Meteorology and climatology. Some of these, such as Air glow, Backing wind, and Millibar, are essentially only concise descriptions or they may cover some specific aspect of a larger subject. On the other hand, such articles as Air pressure, Meteorological instrumentation, and Weather (forecasting and prediction), deal with

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fundamentals or more general aspects. Thus, the reader has various choices. If he is interested in all aspects of a subject, he can read all of the articles listed under that subject heading. He can then go to the lists under the headings cited in the cross references, and select from these lists the articles related to his basic area of interest.

As an alternative, the reader can select from the list only those articles dealing with the general aspects of the subject and pass up the short, descriptive articles or those on specific topics. For example, a large number of the several hundred articles listed under Geology (mineralogy and petrology) are concerned with specific minerals and rocks. The selective reader might pass by these to concentrate on the more general articles such as Clay minerals, Igneous rocks, Magma, Metamorphic rocks, Sedimentary rocks, and so on. Here, too, the reader should refer to the other subject headings cited at the end of the Geology (mineralogy and petrology) list in order to locate related articles that are classified for the purpose of the topical index in other areas.

Undue repetition of article titles among several lists was avoided by not placing *all* related articles under each heading. For example, the titles of the many crystal articles, listed under Solid-state physics, would have to be repeated under Geology (mineralogy and petrology) to make that list complete. To avoid this repetition, a cross reference at the end of Geology (mineralogy and petrology) states: "For additional treatment of crystalline materials *see* Solid-state physics." Most of the lists carry similar references.

Acoustics

Absorption Absorption (sound). Acoustic mine. Acoustic torpedo. Acoustics Aircraft noise Anechoic chamber Architectural acoustics Audio Audio amplifier Audiometry Beat. Bel Binaural sound Crossover network Deafness. Decibel Directivity Disk recording Doppler effect. Ear protectors Echo Echo sounder. Electroacoustics. Equalization, frequency-response Fidelity Filter, acoustic Fletcher-Munson contours. Flutter and wow Free field Hearing Hearing aid. High fidelity Hydrophone Image, acoustical Impedance, acoustic. Interference of waves Interferometer, acoustic Inverse square law. Loudness Loudspeaker. Magnetic recording Masking (sound) Megaphone. Microbar Microphone Microphonics Muffler. Musical acoustics Musical instruments. Noise, acoustic Noise control Noise control in buildings Noise measurement. Octave Optical recording Overtone (music and acoustics) Partial tone Phon Phonetics Phonograph Physiological acoustics Point source Psychoacoustics Public address system Radiometer, acoustic Recording Reflection (sound). Reflection and transmission coefficients Refraction of waves. Resonance (acoustics and mechanics) Resonator, acoustic Reverberation Scale (music). Silencer Siren (acoustics) SOFAR. Sonar Sone Sonics Sonobuoy Sound Sound intensity Sound pressure Sound recording Sound reproduction systems, electrical Sound track Soundproofing. Stereophonic sound Tone (music and acoustics) Transducer, underwater. Tuning fork Ultrasonics. Underwater sound Underwater telephone Vocoder Volume unit (VU) Wire recording

For articles on wave motion and vibration *see* CLASSICAL MECHANICS For transmission of sound by modulated carrier waves over electric circuits or radio waves *see* COMMUNICATIONS For the physiology of hearing *see* COMPARATIVE PHYSIOLOGY

Aeronautical engineering

Adhesive structural Aerodynamic center Aerodynamic force Aerodynamic wave drag Aerodynamics. Aeroelasticity Aeromechanics. Aeronautical engineering Aeronautics. Aerostat. Aerostatics Aerothermodynamics. Afterburner. Air navigation. Air pocket Air traffic control Air transportation. Aircraft. Aircraft compass system Aircraft engine. Aircraft engine, reciprocating. Aircraft engine performance. Aircraft fuel. Aircraft instrument panel Aircraft instrumentation. Aircraft low-approach system (ILS). Aircraft noise. Aircraft propulsion Aircraft testing. Air cushion vehicle Airfoil. Airfoil profile. Airframe. Airplane Airport engineering. Airport surface detection equipment Airship. Air-speed indicator. Air-velocity measurement. Altimeter, pressure. Altimeter, radio Aluminum Anemometer. Armament, air. Aspect ratio. Autogiro Automatic horizon Autopilot. Aviation Balloon Blimp. Borane. Boron fuel. Center of gravity. Ceramic technology. Chemical fuel. Compass, radio. Convertiplane Diffuser. Dirigible. Drone Dynamic similarity. Elevator, aircraft. Fire detector. Flight Flight characteristics Flight con-

[illegible]

personic flight. Instrument landing system. Jet flow Jet fuel Jet propulsion Jet velocity. Kerosine. Kite. Landing gear. Mach number Magnesium Metal-base fuel Missile Model theory. Nozzle. Nuclear aircraft propulsion Nuclear rocket. Optical tracking Ornithopter Oxidation process Parachute Pitot tube Propellant Propeller, air. Propulsion Pulse jet. Ram jet Rate of climb indicator Reentry Refractory Rocket Rocket engine Rocket-sled testing Rudder, aircraft Runway, airport Sailplane Seaplane. Similitude. Skin friction Sonic barrier Sonic boom Specific fuel consumption. Specific impulse [illegible] dicator Strai [illegible] Subsonic flig [illegible] Supersonic d [illegible] Supersonic flight Tail assembly. Thermal stress Throttled flow Thrust. Transonic flight Turbine propulsion Turbofan Turbojet. Turboprop Turboram jet. Turbulent flow. Turn and bank indicator. Vertical take-off and landing Wind tunnel. Wind tunnel instrumentation. Wing Wing loading. Wing structure Yaw indicator.

For theoretical aspects of air flow phenomena *see* FLUID MECHANICS For articles on propulsion methods, devices, and fuels *see* PROPULSION. For aircraft armament and further articles on missile technology *see* ARMAMENT; SPACE TECHNOLOGY

For further aspects of structural design *see* ENGINEERING MECHANICS. For information on control systems and instrumentation *see* COMMUNICATIONS; CONTROL SYSTEMS ENGINEERING; NAVIGATION.

Agriculture

Agricultural chemistry. Agricultural engineering. Agricultural machinery. Agricultural meteorology. Agricultural science (animal). Agricultural science (plant). Agricultural soil and crop practices. Agriculture. Agriculture (drainage). Agriculture (structures). Agronomy. Alfalfa. Almond Animal-feed composition. Apple Apricot. Artichoke. Asparagus. Avocado. Banana. Barley. Bean. Bee and beekeeping. Beet. Bermuda grass. Blackberry. Blueberry. Bluegrass. Bluestem grass. Brazil nut. Breeding (animal). Breeding (plant). Broccoli. Brome grass. Brussels sprouts. Buckwheat. Burlap. Butter. Cabbage. Cacao Cantaloupe. Canvas Carrot. Cashew. Cattle production, beef. Cattle production, dairy. Cauliflower. Celery. Cereal. Cheese. Cherry Citron. Coconut. Coffee. Collard. Corn. Cotton. Cover crops. Cowpea. Crabapple. Cranberry. Cress. Cucumber. Currant. Dairy machinery. Dallis grass. Date. Defoliant. Drought. Egg (fowl). Eggplant. English walnut. Fertilizing. Fescue. Fiber crops. Fig. Filbert. Flax. Floriculture. Forestry, farm. Frost. Fruit (tree) Fruit growing (small). Fumigant. Garlic. Gibberellin. Goat. Gooseberry. Grain crops. Grape culture. Grapefruit. Grass crops Growing season Hemp Herbicide. Honeydew melon. Hop Horse production. Horseradish. Horticultural crops. Insect control, biological Insecticide. Irrigation of crops Kale Kohlrabi. Kudzu Kumquat. Landscape architecture. Legume forages. Lemon. Lespedeza. Lettuce. Lime (botanical). Lupine. Mandarin. Melon growing. Milk. Millet. Miticide. Mohair. Mule production. Muskmelon Mustard. Nectarine. Nematocide. Nitration Nut crop culture. Oats Okra. Olive. Onion. Orange. Ornamental plant. Paprika. Parsley Parsnip. Pea. Peach. Peanut. Pear. Pecan Pedology. Pepper. Persian melon. Pimento. Pineapple. Pistachio. Plant disease. Plant physiology Plum. Pomegranate. Potato, Irish. Potato, sweet. Poultry production. Pumpkin. Quince. Radish. Rape Raspberry Redtop grass. Rodenticide. Rhubarb. Rice Rural electrification. Rural sanitation Rust (microbiology). Rutabaga. Rye. Sheep Silk. Smut (microbiology). Soil. Soil (great soil groups) Soil mechanics. Soil sterilization. Sorghum. Soybean Spinach. Squash. Strawberry. Sugar beet. Sugar cane. Sugar crops. Sunflower. Swine production Tangerine. Terracing (agricultural) Timothy. Tobacco. Tomato. Tractor. Turnip. Vegetable growing. Vetch. Water softening. Watermelon. Wheat. Wool

For such aspects of agriculture as wildlife management, farm fish ponds, land range management *see* CONSERVATION. For more information on the physiological processes *see* PLANT PHYSIOLOGY.

Air conditioning, heating, and ventilation

See MECHANICAL ENGINEERING.

Analytical chemistry

Activation analysis. Analytical chemistry. Analytical chemistry, errors in. Archeological chemistry. Assay. Balance (analytical). Balance (weighing instrument). Birefringence. Boiler feed water. Boiler water. Buret. Camera. Chemical microscopy. Chemical dating. Chromatography. Cinematography. Colorimetric analysis. Colorimetry. Coulometric analysis. Crystal optics Crystallography. Electrodeposition analysis. Electrooptics. Extraction Filter, color, Flame photometry. Flocculation. Fluorimetric analysis. Forensic chemistry. Gas analysis. Gas chromatography. Gravimetric analysis. Infrared spectroscopy. Interferometry. Ion exchange. Line spectrum. Mass spectroscope. Microscope. Nephelometric analysis. Nucleation. Optical methods of chemical analysis. Optics. Organic quantitative analysis. Photography. Photography, color. Photometry. Pipet. Polarimetric analysis. Polarized light. Polarographic analysis Precipitation (chemistry). Prism, optical. Projection systems, optical Qualitative chemical analysis. Quantitative chemical analysis. Radioactivity (applications). Radioisotope (assay). Radiometric assay. Raman effect. Raw water. Reagent chemicals. Refractometric analysis. Sampling techniques. Separation (chemical and physical). Solubilizing of samples. Spectrochemical analysis. Spectrography. Spectrohelioscope. Spectrophotometric analysis. Spectroscopy. Spectroscopy of combustion Spot-test analysis Stoichiometry Supersaturation. Thermoanalysis Titration. Titration, amperometric. Titration, conductimetric Titration, potentiometric. Trace analysis. Turbidimetric analysis. Units, systems of Vacuum fusion. Volatilization. Volumetric analysis. Volumetric flask. Weight Weight measurement. X-ray crystallography X-ray diffraction. X-ray fluorescence analysis X-ray optics X-ray powder methods. X-ray tube.

For the application of quantitative measurement and analysis in fields of science and technology *see* ATOMIC PHYSICS, CHEMICAL ENGINEERING, GEOLOGY (MINERALOGY AND PETROLOGY), INORGANIC CHEMISTRY; METALLURGICAL ENGINEERING; ORGANIC CHEMISTRY, PHYSICAL CHEMISTRY.

Anatomy

See ANIMAL ANATOMY, INVERTEBRATE ZOOLOGY; PALEOBOTANY, PALEONTOLOGY, PLANT ANATOMY, VERTEBRATE ZOOLOGY

Animal anatomy

Abdomen. Adrenal gland Anatomy, regional Ankle. Anus Aorta. Appendix Arm. Artery. Autonomic nervous system Blood vessels. Bone. Brain Breast Bronchus Bursa. Capillary (anatomical) Cardiovascular system. Central nervous

system Circulatory system. Collarbone. Colon. Copulatory organ. Cowper's gland. Cranial nerve. Cranium Dentition. Digestive system Ear. Endocrine system. Esophagus. Eye. Fallopian tube. Foot. Gallbladder. Ganglion Gastrointestinal tract. Gill (anatomy). Hand Head. Heart Hip Intestine. Joint (anatomical). Larynx. Leg Ligament. Liver. Lung Lymph node Lymphatic system. Meninges. Mouth. Muscular system. Neck. Nervous system. Neuron Nose Ovary. Pancreas. Parasympathetic nervous system. Parathyroid gland Pelvis. Penis Peritoneum Pharynx. Pineal body Pituitary gland Prostate gland. Rectum. Reproductive system. Respiratory system Reticular formation (brain). Sense organ. Shoulder Sinus Skeletal system. Skin Skull Spinal cord Spine Stomach Spleen Sympathetic nervous system. Tendon Thigh Thyroid gland Throat Tongue Tonsil Trunk. Urinary bladder Urinary system Urogenital system Uterus Vagina Vein Vertebra. Vocal cords Wrist.

See also ANIMAL PATHOLOGY; GROWTH AND MORPHOGENESIS; HISTOLOGY; INVERTEBRATE ZOOLOGY; VERTEBRATE ZOOLOGY

Animal behavior

See ANIMAL ECOLOGY; PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL.

Animal ecology

Animal community Biogeography Biological productivity. Biomass *Community classification. Deep-sea fauna* Ecologic interactions. Ecological systems, energy in. *Ecology* Ecology, applied. Ecology, human Ecosystem Environment. *Food chain* Freshwater ecosystem Limnology Marine ecosystem Phoresy Plant community. *Population dynam*ics [illegible]

[illegible]

For ecological aspects concerned with wildlife management *see* CONSERVATION, for animal distribution in time *see* EVOLUTION, for functional and behavioral aspects *see* GENERAL PHYSIOLOGY, PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL. For invertebrate animals *see* INVERTEBRATE ZOOLOGY, for physical and biotic aspects *see* PHYSICAL GEOGRAPHY; for other animal groups *see* VERTEBRATE ZOOLOGY.

Animal pathology

Ablastin Achondroplasia Acne. Actinomycosis Actinophage Addison's disease. *Adenovirus* Adrenal disorders. Aerobacter Agamma-globulinemia Agglutination reaction *Agglutinin* Allergy, atopic. Amebiasis para-Aminobenzoic acid Analgesics. Anaphylaxis Anaplasia Anemia. Anesthetic. Aneurysms. Angina pectoris. Animal virus Anoxia Anthrax Antibody. Antigen. Antigen-antibody reaction Antihistamines Antitoxin. Appendicitis Arbor viral encephalitides. Arthritis. Arthus reaction. Ascariasis. Aspergillosis Asthma. Atrophy. Avian leukosis. Bacillary dysentery. Bacteria, lysogenic. Bacteriology, medical Bacteriophage. Balantidiasis. Barbiturates. Bejel Benzedrine. Beriberi Biological specificity. Biologicals. Birthmark. Blackleg Blastomycosis Blood groups. Blood-plate hemolysis. Botulism. Breast disorders. Bronchial disorders. Bronchiectasis. Brucellosis. Buerger's disease. Burn. Bursitis. Cachexia. Cancer (biology). Candidiasis. Carbuncle. Carrion's disease. Cat scratch disease. Cataract. Cathartics. Cerebral palsy. Chagas' disease. Chickenpox and shingles Cholera vibrio. Chromomycosis. Circulation disorders Cirrhosis. Clinical pathology. Clonorchiasis. Coccidioidomycosis. Coliphage. Colitis. *Complement* (serum). *Complement-fixation test Concussion* Conglutination Conjunctivitis Constipation. Coxsackie virus Cryptococcosis. Culture. Culture, embryonated egg. Culture, tissue. Cystitis. Death. Dengue fever. Dentistry. Dermatitis Dermatophytosis Diabetes Diarrhea. *Diphtheria*. Disease. Disease carrier. Drug resistance. Dyschondroplasia. ECHO virus. Eczema. Edema. Effective dose 50. Embolism Embolus Encephalitis, equine Endocarditis. Enteric bacilli Enterovirus Epidemic. Epidemiology. Escherichia Esophagus, disorders of Exanthem subitum. Eye disorders. Eye glasses. Fascioliasis Fasciolopsiasis Fever. Fièvre boutonneuse [illegible]

[illegible] Gangrene, gas Gastrointestinal tract disorders Germ. German measles. Germfree vertebrate. Gerontology Glanders Glaucoma Goiter. Gonorrhea. Gout Gram-negative diplococci. Granuloma inguinale. Guinea worm infection Harelip. Hay fever. *Heart disorders* Heartwater disease. Hemadsorption viruses Hematologic disorders. Hemophilia. Hemophilic bacteria. Hemorrhage. Hemorrhagic septic[illegible] tism [illegible] Heter[illegible] kin's [illegible] Hyaluronidase *Hyperplasia*. Hypersensitivity. Hypertension. Hypertrophy. Hypnotic. Hypoplasia. Ileitis Immunity [illegible]

[illegible] Infectious disease control Infectious disease transmission Infectious [illegible] Inflamm[illegible] orders [illegible] Jaundice [illegible] ders. Ketosi[illegible] Lancet[illegible] ders. Leishmaniasis. Leprosy. Leptospira. Lethal dose 50. Leukemia Leukocidin Leukopenia. Listeriosis. Liver disorders Louping-ill Lung disorders Lupus erythematosus [illegible]

For further aspects of structural design *see* ENGINEERING MECHANICS. For information on control systems and instrumentation *see* COMMUNICATIONS; CONTROL SYSTEMS ENGINEERING; NAVIGATION.

Agriculture

Agricultural chemistry. Agricultural engineering Agricultural machinery. Agricultural meteorology. Agricultural science (animal). Agricultural science (plant). Agricultural soil and crop practices. Agriculture. Agriculture (drainage). Agriculture (structures). Agronomy. Alfalfa. Almond. Animal-feed composition. Apple. Apricot. Artichoke. Asparagus. Avocado. Banana. Barley. Bean. Bee and beekeeping. Beet. Bermuda grass. Blackberry. Blueberry Bluegrass. Bluestem grass. Brazil nut Breeding (animal). Breeding (plant). Broccoli. Brome grass. Brussels sprouts. Buckwheat. Burlap. Butter. Cabbage. Cacao Cantaloupe Canvas Carrot. Cashew. Cattle production, beef. Cattle production, dairy. Cauliflower. Celery. Cereal Cheese. Cherry. Citron. Coconut. Coffee. Collard. Corn. Cotton. Cover crops Cowpea. Crabapple. Cranberry. Cress. Cucumber. Currant. Dairy machinery. Dallis grass. Date. Defoliant. Drought. Egg (fowl). Eggplant. English walnut Fertilizing. Fescue. Fiber crops. Fig. Filbert. Flax. Floriculture Forestry, farm. Frost Fruit (tree). Fruit growing (small) Fumigant. Garlic. Gibberellin Goat Gooseberry. Grain crops. Grape culture Grapefruit Grass crops. Growing season. Hemp Herbicide. Honeydew melon. Hop. Horse production Horseradish. Horticultural crops. Insect control, biological. Insecticide. Irrigation of crops. Kale. Kohlrabi Kudzu Kumquat. Landscape architecture. Legume forages Lemon. Lespedeza. Lettuce. Lime (botanical) Lupine. Mandarin. Melon growing. Milk. Millet. Miticide. Mohair. Mule production. Muskmelon Mustard. Nectarine. Nematocide. Nitration. Nut crop culture. Oats Okra. Olive Onion. Orange. Ornamental plant Paprika. Parsley. Parsnip. Pea. Peach. Peanut. Pear. Pecan. Pedology. Pepper Persian melon Pimento. Pineapple. Pistachio. Plant disease. Plant physiology. Plum Pomegranate. Potato, Irish. Potato, sweet. Poultry production. Pumpkin Quince. Radish. Rape. Raspberry. Redtop grass Rodenticide. Rhubarb. Rice. Rural electrification. Rural sanitation. Rust (microbiology). Rutabaga. Rye. Sheep Silk. Smut (microbiology). Soil. Soil (great soil groups). Soil mechanics. Soil sterilization. Sorghum Soybean. Spinach. Squash. Strawberry. Sugar beet. Sugar cane. Sugar crops. Sunflower. Swine production. Tangerine. Terracing (agricultural). Timothy. Tobacco. Tomato. Tractor. Turnip. Vegetable growing. Vetch. Water softening. Watermelon. Wheat. Wool.

For such aspects of agriculture as wildlife management, farm fish ponds, land range management *see* CONSERVATION. For more information on the physiological processes *see* PLANT PHYSIOLOGY.

Air conditioning, heating, and ventilation

See MECHANICAL ENGINEERING.

Analytical chemistry

Activation analysis. Analytical chemistry. Analytical chemistry, errors in. Archeological chemistry. Assay. Balance (analytical). Balance (weighing instrument). Birefringence. Boiler feed water. Boiler water. Buret. Camera. Chemical microscopy. Chemical dating. Chromatography. Cinematography. Colorimetric analysis. Colorimetry. Coulometric analysis Crystal optics. Crystallography. Electrodeposition analysis. Electrooptics. Extraction. Filter, color, Flame photometry. Flocculation. Fluorimetric analysis. Forensic chemistry. Gas analysis Gas chromatography. Gravimetric analysis. Infrared spectroscopy. Interferometry. Ion exchange. Line spectrum Mass spectroscope. Microscope. Nephelometric analysis. Nucleation. Optical methods of chemical analysis Optics. Organic quantitative analysis. Photography. Photography, color. Photometry. Pipet. Polarimetric analysis. Polarized light. Polarographic analysis. Precipitation (chemistry). Prism, optical. Projection systems, optical. Qualitative chemical analysis. Quantitative chemical analysis. Radioactivity (applications). Radioisotope (assay) Radiometric assay. Raman effect. Raw water. Reagent chemicals. Refractometric analysis. Sampling techniques. Separation (chemical and physical). Solubilizing of samples. Spectrochemical analysis. Spectrography. Spectrohelioscope Spectrophotometric analysis. Spectroscopy. Spectroscopy of combustion. Spot-test analysis Stoichiometry Supersaturation. Thermoanalysis. Titration. Titration, amperometric. Titration, conductimetric. Titration, potentiometric Trace analysis. Turbidimetric analysis. Units, systems of. Vacuum fusion. Volatilization. Volumetric analysis Volumetric flask Weight. Weight measurement. X-ray crystallography. X-ray diffraction. X-ray fluorescence analysis. X-ray optics. X-ray powder methods. X-ray tube.

For the application of quantitative measurement and analysis in fields of science and technology *see* ATOMIC PHYSICS; CHEMICAL ENGINEERING; GEOLOGY (MINERALOGY AND PETROLOGY); INORGANIC CHEMISTRY; METALLURGICAL ENGINEERING; ORGANIC CHEMISTRY; PHYSICAL CHEMISTRY.

Anatomy

See ANIMAL ANATOMY; INVERTEBRATE ZOOLOGY; PALEOBOTANY; PALEONTOLOGY; PLANT ANATOMY; VERTEBRATE ZOOLOGY.

Animal anatomy

Abdomen. Adrenal gland. Anatomy, regional. Ankle. Anus. Aorta. Appendix. Arm. Artery. Autonomic nervous system. Blood vessels. Bone. Brain. Breast. Bronchus. Bursa. Capillary (anatomical). Cardiovascular system. Central nervous

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See also ANIMAL PATHOLOGY; GROWTH AND MORPHOGENESIS; HISTOLOGY; INVERTEBRATE ZOOLOGY, VERTEBRATE ZOOLOGY.

Animal behavior

See ANIMAL ECOLOGY, PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL.

Animal ecology

Animal community Biogeography. Biological productivity Biomass. *Community classification* Deep-sea fauna Ecologic interactions Ecological systems, energy in Ecology Ecology, applied Ecology, human Ecosystem *Environment. Food chain.* Freshwater ecosystem Limnology. Marine ecosystem Phoresy. Plant community *Population dynamics* Protective coloration Pyramid of numbers Social animals. Social hierarchy. *Social insects* Space biology Species population Succession, ecological Terrestrial ecosystem Zoogeographic region. Zoogeography.

For ecological aspects concerned with wildlife management *see* CONSERVATION, for animal distribution in time *see* EVOLUTION; for functional and behavioral aspects *see* GENERAL PHYSIOLOGY, PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL. For invertebrate animals *see* INVERTEBRATE ZOOLOGY; for physical and biotic aspects *see* PHYSICAL GEOGRAPHY, for other animal groups *see* VERTEBRATE ZOOLOGY

Animal pathology

Ablastin. Achondroplasia Acne Actinomycosis. Actinophage Addison's disease Adenovirus. Adrenal disorders Aerobacter. Agamma-globulinemia Agglutination reaction Agglutinin Allergy, atopic. Amebiasis. para-Aminobenzoic acid. Analgesics Anaphylaxis. Anaplasia Anemia Anesthetic. Aneurysm. Angina pectoris Animal virus. Anoxia Anthrax Antibody Antigen. Antigen-antibody reaction. Antihistamines Antitoxin Appendicitis Arbor viral encephalitides. Arthritis. Arthus reaction. Ascariasis. Aspergillosis. Asthma. Atrophy. Avian leukosis. Bacillary dysentery. Bacteria, lysogenic. Bacteriology, medical. Bacteriophage. Balantidiasis. Barbiturates. Bejel. Benzedrine. Beriberi. Biological specificity. Biologicals. Birthmark. Blackleg. Blastomycosis. Blood groups. Blood-plate hemolysis Botulism. Breast disorders Bronchial disorders Bronchiectasis. Brucellosis Buerger's disease Burn Bursitis. Cachexia. Cancer (biology). Candidiasis. Carbuncle Carrion's disease. Cat scratch disease. Cataract. Cathartics Cerebral palsy. Chagas' disease. Chickenpox and shingles. Cholera vibrio Chromomycosis Circulation disorders. Cirrhosis. Clinical pathology. Clonorchiasis. Coccidioidomycosis. Coliphage Colitis. Complement (serum). Complement fixation test. Concussion. Conglutination Conjunctivitis Constipation. Coxsackie virus. Cryptococcosis Culture. Culture, embryonated egg. Culture, tissue. Cystitis. Death Dengue fever. Dentistry. Dermatitis. *Dermatophytosis* Diabetes Diarrhea Diphtheria. Disease Disease carrier. Drug resistance Dyschondroplasia. ECHO virus. Eczema Edema. Effective dose 50. Embolism Embolus Encephalitis, equine. Endocarditis Enteric bacilli Enterovirus. Epidemic

[illegible]

Gangrene. gas. Gastrointestinal tract disorders Germ German measles. Germfree vertebrate Gerontology. Glanders Glaucoma. Goiter. Gonorrhea Gout Gram-negative diplococci. Granuloma inguinale. Guinea worm infection. Harelip. Hay fever. Heart disorders Heartwater disease. Hemadsorption viruses. Hematologic disorders. Hemophilia Hemophilic bacteria Hemorrhage. Hemorrhagic

[illegible]

Hyperplasia Hypersensitivity Hypertension. Hypertrophy. Hypnotic. Hypoplasia Ileitis Immunity. Immunology. Impetigo. IMViC test *Inclusion* blennorrhea. Inclusion bodies (virus). Infant diarrhea Infarction. Infection *Infection, lytic.* Infectious disease control. Infectious disease transmission *Infectious* [illegible]

Inflamm [illegible]

orders o [illegible]

Jaundice. [illegible] disease. Joint (anatomical) disorders. Keratitis. Keratoconjunctivitis (*epidemic*). Ketosis Kidney disorders. Klebsiella pneumoniae. *Lancefield* differentiation scheme Larynx disorders. Leishmaniasis Leprosy Leptospira Lethal dose 50 Leukemia Leukocidin Leukopenia Listeriosis Liver disorders. Louping ill. Lung disorders [illegible]

meningitis. Lymphogranuloma venereum. Lymphogranuloma-psittacosis group. Lysin. Lytic reaction. Malaria. Malnutrition. Mastitis (cows). Measles. Medicine. Melioidosis. Meningitis. Meningococcus. Menopause. Mental illness. Metabolic disorders. Metaplasia Mole (skin). Molluscum contagiosum. *Moraxella lacunata*. Mouse viral leukemias. Mouth disorders. Multiple sclerosis. Mumps. Muscular dystrophy. Muscular system disorders Mycology, medical. Myxomatosis, infectious (rabbits). Myxovirus. Narcotic. Neoplasia. Nephritis. Nervous system disorders. Neutralization reaction (antibody). Neutralizing antibody. Newcastle disease. Nitrofuran. Nocardiosis. Nose disorders. Nursing Obesity. Oncology. Opiates. Opsonin. Osteomyelitis Pancreas disorders. Papillomatosis, infectious (rabbit). Paracolon bacilli. Paragonimiasis. Parapertussis Parasitology, medical. Paratyphoid fever. Paratyphoid gastroenteritis. Parkinson's disease. Pathogen. Pathology Pellagra. Peptic ulcer. Peritonitis. Phagocytosis. Pharmaceuticals testing. Pharynx disorders. Phlebitis. Phlebotomus fever. Pigmentation. Pink eye. Pinta. Pinworm infection. Pituitary gland disorders. Plague. Pleuropneumonia-like organism (PPLO). Pneumococcus. Pneumocystosis. Pneumonia. Pneumonitis. Poison. Poliomyelitis. Precipitin. Precipitin test. Pregnancy Pregnancy, disorders of. Properdin. Prostate disorders. Proteus. Pseudomonas aeruginosa. Pseudotuberculosis Psittacosis. Psoriasis Public health. Pyorrhea. Q fever. Quellung reaction Rabies Ratbite fever. Relapsing fever Reproductive system disorders. Respiratory system disorders Retinitis. Rheumatic fever. Rheumatism. Rickets. Rickettsialpox Rickettsioses. Rous sarcoma Salivary gland virus disease. Salmonella. Scarlet fever. Schistosomiasis Sciatica. Scurvy. Sedation. Senescence. Septicemia. Serology. Shigella. Shock syndrome. Sinusitis Skeletal system disorders. Skin disorders. Skin test. Sleeping sickness, African Smallpox Soft chancre Spinal cord disorders Spirochete Spleen disorders. Sporotrichosis Spotted fever Rocky Mountain. Spotted fever group. Staphylococcus. Sterility Stomach disorders Streptococcus Strongyloidiasis. Sty. Sulfa drugs. Sulfone (antimicrobial use). Surgery. Syphilis. Tapeworm disease. Tetanus. Thiosemicarbazone. Thrombosis. Thyroid gland disorders Tick bite fever, South African. Tick fever, Colorado Tick paralysis Tick typhus, North Queensland. Tick typhus, Siberian Tonsillitis. Tooth disorders. Tophus Toxemia Toxicology. Toxin, bacterial Toxin-antitoxin reaction Toxoplasmosis. Trachoma. Transfusion Trauma. Trench fever. Trichinosis. Trichomoniasis Tuberculosis. Tularemia Tumor. Tumor viruses Typhoid fever. Typhus, scrub. Typhus fever, endemic (flea-borne). Typhus fever, epidemic (louse-borne) Ulcer. Urinalysis. Urinary bladder disorders. Uterine disorders. Vaccination. Vaginal disorders Venereal disease. Vincent's angina. Virulence. Virus Wart. Weil's disease. West Nile fever. Whipworm disease. Whooping cough. Yaws. Yellow fever. Zoonoses.

Animal systematics

Animal kingdom. Animal systematics. Species concept. Taxonomic categories. Type method. Zoological nomenclature.

For specific animal groups *see* INVERTEBRATE ZOOLOGY; VERTEBRATE ZOOLOGY.

Anthropology

Animal evolution. Anthropology, physical. Anthropometry. Anthroposcopy. Archeological chemistry. Archeology. Australopithecus. Chemical dating. *Cro-Magnon man*. Evolution, organic. Fontéchevade man. Fossil man. Heidelberg man Java man Life, origin of. Neanderthal man. Peking man. Piltdown man Pleistocene. Primates (fossil). Proconsul Recent. Rhodesian man. Solo man. Speciation. Steinheim man. Swanscombe man Ternifine man.

See also PALEONTOLOGY

Archeology

See ANTHROPOLOGY

Architectural engineering

See CIVIL ENGINEERING.

Armament

Acoustic mine. Acoustic torpedo Aeronautical engineering Airborne radar Aircraft Airplane. Airship Antisubmarine warfare Armament, air. Armament, army Armament, naval. Atomic bomb Ballistic missile Ballistic range Ballistics, exterior Ballistics, interior Balloon Blimp Borane Ceramic technology Chemical fuel Chemical warfare. Combustion Continuous-wave radar Detonation Dirigible. Doppler radar Electronic countermeasures. Explosion and explosive Fire Fire-control systems Fuel Fulminate. Fuse, explosive Gas mask. Guidance systems Guided missile Hydrazine Hydrogen bomb. Incendiary Inertial guidance system Jamming Jet propulsion Launching pad complex Missile Missile guidance systems Monopulse radar Moving target indication Nitration. Nuclear explosion Oxidation process Passive radar Perchlorate Picric acid Primer (explosive) Propellant Propulsion Pulse jet Pyrotechnics Radar Ram jet Refractory Rocket Rocket staging Shaped charge Ship, naval Smoke Sonar Sonobuoy Submarine Supersonic flight Toluene. Trajectory Underwater demolition

For aircraft information *see* AERONAUTICAL ENGINEERING.

Astronomy

Aberration of light Albedo Aldebaran Alpha Centauri. Andromeda nebula. Antares Antarctic Circle. Aphelion Apogee Apsides. Aquarius. Arctic Circle. Arcturus Areal velocity Aries Asteroid Astrometry. Astronomical coordinate systems As-

tronomical geophysics. Astronomical instruments. Astronomical photography. Astronomical spectroscopy Astronomical unit. Astronomy. Astrophysics. Atmosphere, geochemistry of Atomic clock. Betelgeuse Binary stars Bootes. Calendar. Camera. Cancer (constellation). Capricornus Carbon star. Cardinal points Cassiopeia Celestial mechanics Celestial navigation Celestial sphere Centaurus. Center of mass Central force. Centripetal force. Ceres Chromosphere. Chronograph Chronometer Chronoscope Clock Coal sack Comet. Constellation. Corona, solar Coronograph. Cosmic electrodynamics Cosmic rays Cosmochemistry Cosmogony Cosmology Crab nebula Crux. Cygnus Day Doppler effect Dwarf star Earth (orbital motion) Earth tide Eclipse, astronomical Ecliptic Einstein shift Elements (cosmic abundance) Elements and nuclides (origin) Encke's comet. Ephemeris. Equator. Equinox. Eros. Escape velocity Flying saucers Galaxy, external. Galaxy, the Gemini Geography, mathematical. Giant star. Halley's comet Horizon. Horology. Hyades Interstellar matter Interstellar space Jupiter Latitude, astronomical Leo Libra. Light-year Longitude, astronomical. Lyra Magellanic clouds Magnitude stellar. Mars. Mercury (planet) Meridian Messier number Metagalaxy. Meteor Meteorite Midnight sun Mira Mizar Month Moon Nautical Almanac Nebula Nebulae gaseous Neptune Nova Nutation (astronomy and mechanics) Observatory, astronomical. Occulation. Orbital motion. Orion. Orion nebula Parallax (astronomy). Parsec Pegasus Perigee. Perihelion. Perseus Perturbation (astronomy). Phase (astronomy) Photosphere [illegible] Pleiac[illegible] equin[illegible] clock [illegible] Radiation Radio astronomy Radio telescope Red dwarf star Red shift Retrograde motion Rigel Rocket astronomy. Sagittarius Satellite (astronomy) Saturn Schmidt camera Scorpius Second (time unit) Shadow Sirius Solar constant Solar radiation Solar system Solstice Space Spectrochemical analysis Spectroheliocope Spica Star Star cloud Star clusters Stellar evolution Stellar magnetic field Subgiant star Sun. Sundial Sunspot Supergiant star Supernova Taurus Telescope, astronomical Tide Time Time-interval measurement Transit (astronomy) Trojan planets Tropic of Cancer Tropic of Capricorn Twilight Twinkling stars Umbra Universe. Uranus Ursa Major Ursa Minor. Van Allen radiation Variable star Vega Venus Virgo Watch White dwarf star Wolf Rayett star Year. Zenith Zodiac. Zodiacal light

For articles on space flight and vehicles *see* SPACE TECHNOLOGY For celestial navigation *see* NAVIGATION For articles on the upper atmosphere *see* GEOPHYSICS, METEOROLOGY AND CLIMATOLOGY For further articles on matter-energy relationships in cosmic applications *see* ATOMIC PHYSICS; ELECTROMAGNETIC RADIATION; NUCLEAR PHYSICS. For relativistic and other theoretical considerations regarding the nature of the universe *see* THEORETICAL PHYSICS.

Atomic physics

Absorption. Absorption (electromagnetic radiation). Acceptor atom Angstrom Antiferromagnetism Antimatter Antineutron. Antiproton. Atom Atomic beams Atomic clock Atomic constants. Atomic mass unit. Atomic number. Atomic physics. Atomic structure and spectra Atomic weight Auger effect Baryon Binding energy, nuclear. Boltzmann constant. Boltzmann statistics Boltzmann transport equation Bose-Einstein statistics. Bremsstrahlung Cascade particle. Chemical binding. Chromatography. Collision Compton effect. Conduction band. Conservation of mass Degeneracy (quantum states). Deuteron. Diamagnetism. Donor atom Eigenfunction Eigenvalue Electron. Electron capture. Electron configuration Electron paramagnetic resonance spectroscopy. Electron spin. Electron volt Elementary particle Elements (chemical). Energy level (quantum mechanics). Excited state Exclusion principle Fermi-Dirac statistics. Fine structure (spectrum lines). Ferromagnetism Flame photometry. Gravitation Ground state Harmonic oscillator Hyperfine structure Hyperon Ion Isobar (atomic physics). Isoelectric sequence. Isomerism, nuclear. Isotone Isotope. Isotope shift [illegible] on. Lepton. [illegible] resonance [illegible] Mass de[illegible] mass spectroscope Mendelevium Meson. Metastable state. Microradiography. Microwave spectroscopy. Molecular beams Multipole radiation Muonium. Neptunium. Neutrino. Neutron Neutron, delayed Neutron cross section Neutron diffraction. Nobelium Nuclear moments. Nuclear physics Nuclear structure Nucleon. Nucleus, atomic Packing fraction Paramagnetism Parity Paschen-Back effect Periodic table Perturbation (quantum theory). Planck's constant. Positron [illegible] (physics). [illegible] mechanics. [illegible] Quantum theory, nonrelativistic. Radiation Radiation chemistry Radioactivity. Radio-frequency spectroscopy. Radiography Ritz's combination principle. Rydberg constant. Scattering experiments, atomic and molecular Scattering experiments, nuclear Schrodinger's wave equation Selection rules (physics). Specific charge Spin (quantum mechanics). Stark effect Stationary state Strange particle. Symmetry laws (physics) Triton. Uncertainty principle Valence band V-particle Work function (electronic) X-ray crystallography. X-ray diffraction. X-ray fluorescence analysis. X unit. Zeeman effect

For more detailed nuclear aspects *see* NUCLEAR PHYSICS.

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See also PALEONTOLOGY

Archeology

See ANTHROPOLOGY.

Architectural engineering

See CIVIL ENGINEERING.

Armament

Acoustic mine Acoustic torpedo Aeronautical engineering. Airborne radar Aircraft Airplane. Airship Antisubmarine warfare Armament, air Armament, army Armament, naval Atomic bomb Ballistic missile. Ballistic range Ballistics, exterior. Ballistics, interior. Balloon Blimp Borane. Ceramic technology. Chemical fuel Chemical warfare Combustion. Continuous-wave radar Detonation. Dirigible. Doppler radar Electronic countermeasures Explosion and explosive Fire Fire-control systems Fuel Fulminate. Fuse, explosive Gas mask. Guidance systems Guided missile Hydrazine Hydrogen bomb. Incendiary. Inertial guidance system Jamming Jet propulsion Launching pad complex Missile Missile guidance systems Monopulse radar Moving-target indication Nitration Nuclear explosion Oxidation process Passive radar. Perchlorate Picric acid Primer (explosive) Propellant Propulsion Pulse jet Pyrotechnics Radar Ram jet Refractory. Rocket Rocket staging Shaped charge Ship, naval Smoke Sonar Sonobuoy Submarine Supersonic flight Toluene Trajectory Underwater demolition

For aircraft information *see* AERONAUTICAL ENGINEERING.

Astronomy

Aberration of light. Albedo Aldebaran. Alpha Centauri Andromeda nebula Antares. Antarctic Circle. Aphelion Apogee. Apsides. Aquarius Arctic Circle. Arcturus. Areal velocity. Aries. Asteroid Astrometry. Astronomical coordinate systems As-

tronomical geophysics. Astronomical instruments Astronomical photography Astronomical spectroscopy Astronomical unit Astronomy. Astrophysics. Atmosphere, geochemistry of. Atomic clock. Betelgeuse Binary stars Boötes Calendar. Camera. Cancer (constellation). Capricornus. Carbon star. Cardinal points. Cassiopeia. Celestial mechanics Celestial navigation. Celestial sphere Centaurus Center of mass Central force Centripetal force. Ceres. Chromosphere. Chronograph. Chronometer. Chronoscope Clock. Coal sack. Comet Constellation. Corona, solar Coronograph Cosmic electrodynamics Cosmic rays. Cosmochemistry. Cosmogony. Cosmology Crab nebula. Crux. Cygnus. Day Doppler effect. Dwarf star Earth (orbital motion) Earth tide Eclipse, astronomical Ecliptic. Einstein shift Elements (cosmic abundance) Elements and nuclides (origin). Encke's comet. Ephemeris Equator. Equinox Eros Escape velocity Flying saucers Galaxy, external. Galaxy, the Gemini Geography, mathematical. Giant star. Halley's comet Horizon Horology. Hyades Interstellar matter Interstellar space Jupiter Latitude, astronomical. Leo Libra. Light-year Longitude, astronomical Lyra. Magellanic clouds Magnitude, stellar Mars Mercury (planet) Meridian Messier number Metagalaxy. Meteor Meteorite Midnight sun Mira. Mizar. Month Moon Nautical Almanac Nebula Nebulae gaseous. Neptune Nova. Nutation (astronomy and mechanics). Observatory, astronomical. Occulation Orbital motion Orion Orion nebula. Parallax (astronomy) Parsec Pegasus Perigee Perihelion Perseus Perturbation (astronomy). Phase (astronomy). Photosphere Pisces (constellation) Planet Planetarium. Pleiades Pluto. Polaris Precession of equinoxes Procyon Proton-proton chain. Quartz clock. Radiation Radio astronomy Radio telescope Red dwarf star Red shift Retrograde motion Rigel Rocket astronomy Sagittarius Satellite (astronomy) Saturn Schmidt camera. Scorpius Second (time unit) Shadow. Sirius Solar constant Solar radiation. Solar system Solstice Space Spectrochemical analysis. Spectrohelioscope Spica Star [illegible] evolution [illegible] Sundial S[illegible] rus Telescope, astronomical Tide Time Time-interval measurement. Transit (astronomy) Trojan planets. Tropic of Cancer Tropic of Capricorn Twilight Twinkling stars Umbra Universe Uranus. Ursa Major Ursa Minor Van Allen radiation Variable star Vega Venus Virgo Watch White dwarf star Wolf Rayett star Year. Zenith. Zodiac. Zodiacal light

For articles on space flight and vehicles *see* SPACE TECHNOLOGY For celestial navigation *see* NAVIGATION For articles on the upper atmosphere *see* GEOPHYSICS; METEOROLOGY AND CLIMATOLOGY For further articles on matter-energy relationships in cosmic applications *see* ATOMIC PHYSICS, ELECTROMAGNETIC RADIATION; NUCLEAR PHYSICS For relativistic and other theoretical considerations regarding the nature of the universe *see* THEORETICAL PHYSICS

Atomic physics

Absorption Absorption (electromagnetic radiation). Acceptor atom. Angstrom Antiferromagnetism Antimatter. Antineutron Antiproton Atom. Atomic beams Atomic clock Atomic constants. Atomic mass unit. Atomic number. Atomic physics Atomic structure and spectra. Atomic weight Auger effect Baryon Binding energy, nuclear. Boltzmann constant Boltzmann statistics. Boltzmann transport equation. Bose-Einstein statistics Bremsstrahlung Cascade particle. Chemical binding. Chromatography. Collision Compton effect. Conduction band Conservation of mass Degeneracy (quantum states) Deuteron. Diamagnetism. Donor atom Eigenfunction. Eigenvalue Electron. Electron capture Electron configuration Electron paramagnetic resonance spectroscopy. Electron spin Electron volt Elementary particle. Elements (chemical) Energy level (quantum mechanics). Excited state Exclusion principle Fermi-Dirac statistics Fine structure (spectrum lines). Ferromagnetism Flame photometry. Gravitation Ground state Harmonic oscillator Hyperfine structure. Hyperon Ion Isobar (atomic physics) Isoelectric sequence Isomerism nuclear. Isotone Isotope. Isotope shift Isotope spin Larmor precession Lepton Magnetic moment, electron Magnetic resonance Magnetism Magnetization Magneton. Mass defect Mass number Mass spectroscope Mendelevium Meson Metastable state Microradiography. Microwave spectroscopy Molecular beams. Multipole radiation Muonium Neptunium. Neutrino Neutron Neutron, delayed. Neutron cross section Neutron diffraction Nobelium Nuclear moments Nuclear physics Nuclear structure. Nucleon Nucleus, atomic Packing fraction. Paramagnetism Parity Paschen-Back effect Periodic table. Perturbation (quantum theory) Planck's constant Positron Positronium Proton Quantum (physics). Quantum electrodynamics Quantum mechanics Quantum numbers. Quantum statistics. Quantum theory nonrelativistic Radiation Radiation chemistry Radioactivity. Radio-frequency spectroscopy. Radiography Ritz's combination principle Rydberg constant Scatter[illegible]

[illegible] Specific charge Spin (quantum mechanics) Stark effect Stationary state Strange particle Symmetry laws (physics). Triton Uncertainty principle. Valence band. V particle. Work function (electronic) X-ray crystallography. X-ray diffraction. X-ray fluorescence analysis X-unit. Zeeman effect.

For more detailed nuclear aspects *see* NUCLEAR PHYSICS

meningitis. Lymphogranuloma venereum. Lymphogranuloma-psittacosis group. Lysin. Lytic reaction. Malaria. Malnutrition. Mastitis (cows). Measles. Medicine. Melioidosis. Meningitis. Meningococcus. Menopause. Mental illness. Metabolic disorders. Metaplasia. Mole (skin). Molluscum contagiosum. Moraxella lacunata. Mouse viral leukemias. Mouth disorders. Multiple sclerosis. Mumps. Muscular dystrophy. Muscular system disorders. Mycology, medical. Myxomatosis, infectious (rabbits). Myxovirus. Narcotic. Neoplasia. Nephritis. Nervous system disorders. Neutralization reaction (antibody). Neutralizing antibody. Newcastle disease. Nitrofuran. Nocardiosis. Nose disorders. Nursing. Obesity. Oncology. Opiates. Opsonin. Osteomyelitis. Pancreas disorders. Papillomatosis, infectious (rabbit). Paracolon bacilli. Paragonimiasis. Parapertussis. Parasitology, medical. Paratyphoid fever. Paratyphoid gastroenteritis. Parkinson's disease. Pathogen. Pathology. Pellagra. Peptic ulcer. Peritonitis. Phagocytosis. Pharmaceuticals testing. Pharynx disorders. Phlebitis. Phlebotomus fever. Pigmentation. Pink eye. Pinta. Pinworm infection. Pituitary gland disorders. Plague. Pleuropneumonia-like organism (PPLO). Pneumococcus. Pneumocystosis. Pneumonia. Pneumonitis. Poison. Poliomyelitis. Precipitin. Precipitin test. Pregnancy. Pregnancy, disorders of. Properdin. Prostate disorders. Proteus. Pseudomonas aeruginosa. Pseudotuberculosis. Psittacosis. Psoriasis. Public health. Pyorrhea. Q fever. Quellung reaction. Rabies. Ratbite fever. Relapsing fever. Reproductive system disorders. Respiratory system disorders. Retinitis. Rheumatic fever. Rheumatism. Rickets. Rickettsialpox. Rickettsioses. Rous sarcoma. Salivary gland virus disease. Salmonella. Scarlet fever. Schistosomiasis. Sciatica. Scurvy. Sedation. Senescence. Septicemia. Serology. Shigella. Shock syndrome. Sinusitis. Skeletal system disorders. Skin disorders. Skin test. Sleeping sickness, African. Smallpox. Soft chancre. Spinal cord disorders. Spirochete. Spleen disorders. Sporotrichosis. Spotted fever, Rocky Mountain. Spotted fever group. Staphylococcus. Sterility. Stomach disorders. Streptococcus. Strongyloidiasis. Sty. Sulfa drugs. Sulfone (antimicrobial use). Surgery. Syphilis. Tapeworm disease. Tetanus. Thiosemicarbazone. Thrombosis. Thyroid gland disorders. Tick bite fever, South African. Tick fever, Colorado. Tick paralysis. Tick typhus, North Queensland. Tick typhus, Siberian. Tonsillitis. Tooth disorders. Tophus. Toxemia. Toxicology. Toxin, bacterial. Toxin-antitoxin reaction. Toxoplasmosis. Trachoma. Transfusion. Trauma. Trench fever. Trichinosis. Trichomoniasis. Tuberculosis. Tularemia. Tumor. Tumor viruses. Typhoid fever. Typhus, scrub. Typhus fever, endemic (flea-borne). Typhus fever, epidemic (louse-borne). Ulcer. Urinalysis. Urinary bladder disorders. Uterine disorders. Vaccination. Vaginal disorders. Venereal disease. Vincent's angina. Virulence. Virus. Wart. Weil's disease. West Nile fever. Whipworm disease. Whooping cough. Yaws. Yellow fever. Zoonoses.

Animal systematics

Animal kingdom. Animal systematics. Species concept. Taxonomic categories. Type method. Zoological nomenclature.

For specific animal groups *see* INVERTEBRATE ZOOLOGY; VERTEBRATE ZOOLOGY.

Anthropology

Animal evolution. Anthropology, physical. Anthropometry. Anthroposcopy. Archeological chemistry. Archeology. Australopithecus. Chemical dating. Cro-Magnon man. Evolution, organic. Fontéchevade man. Fossil man. Heidelberg man. Java man. Life, origin of. Neanderthal man. Peking man. Piltdown man. Pleistocene. Primates (fossil). Proconsul. Recent. Rhodesian man. Solo man. Speciation. Steinheim man. Swanscombe man. Ternifine man.

See also PALEONTOLOGY.

Archeology

See ANTHROPOLOGY.

Architectural engineering

See CIVIL ENGINEERING.

Armament

Acoustic mine. Acoustic torpedo. Aeronautical engineering. Airborne radar. Aircraft. Airplane. Airship. Antisubmarine warfare. Armament, air. Armament, army. Armament, naval. Atomic bomb. Ballistic missile. Ballistic range. Ballistics, exterior. Ballistics, interior. Balloon. Blimp. Borane. Ceramic technology. Chemical fuel. Chemical warfare. Combustion. Continuous-wave radar. Detonation. Dirigible. Doppler radar. Electronic countermeasures. Explosion and explosive. Fire. Fire-control systems. Fuel. Fulminate. Fuse, explosive. Gas mask. Guidance systems. Guided missile. Hydrazine. Hydrogen bomb. Incendiary. Inertial guidance system. Jamming. Jet propulsion. Launching pad complex. Missile. Missile guidance systems. Monopulse radar. Moving-target indication. Nitration. Nuclear explosion. Oxidation process. Passive radar. Perchlorate. Picric acid. Primer (explosive). Propellant. Propulsion. Pulse jet. Pyrotechnics. Radar. Ram jet. Refractory. Rocket. Rocket staging. Shaped charge. Ship, naval. Smoke. Sonar. Sonobuoy. Submarine. Supersonic flight. Toluene. Trajectory. Underwater demolition.

For aircraft information *see* AERONAUTICAL ENGINEERING.

Astronomy

Aberration of light. Albedo. Aldebaran. Alpha Centauri. Andromeda nebula. Antares. Antarctic Circle. Aphelion. Apogee. Apsides. Aquarius. Arctic Circle. Arcturus. Areal velocity. Aries. Asteroid. Astrometry. Astronomical coordinate systems. As-

sion Thiamine Threonine. Thyroid gland. Transamination. Triglyceride. Triphosphopyridine nucleotide (TPN) Tryptophan Tyrosine Ultracentrifuge Urea (biochemistry). Uric acid. Uridine diphosphoglucose (UDPG). Urine. Valine. Vitamin Vitamin A Vitamin B_6. Vitamin B_{12}. Vitamin D Vitamin E. Vitamin K X-ray diffraction.

For information on the disease processes *see* ANIMAL PATHOLOGY; for articles in animal physiology *see* COMPARATIVE PHYSIOLOGY; for other articles on carbon compounds *see* ORGANIC CHEMISTRY.

Biology

See AGRICULTURE; ANIMAL ANATOMY; ANIMAL ECOLOGY, ANIMAL PATHOLOGY; ANIMAL SYSTEMATICS, ANTHROPOLOGY, BIOCHEMISTRY; BIOPHYSICS, COMPARATIVE PHYSIOLOGY; CYTOLOGY, EVOLUTION; FOOD ENGINEERING; FORESTRY; GENERAL PHYSIOLOGY; GENETICS; GROWTH AND MORPHOGENESIS; HISTOLOGY, INVERTEBRATE ZOOLOGY, MEDICAL MICROBIOLOGY; MICROBIOLOGY; PALEOBOTANY; PALEONTOLOGY; PLANT ANATOMY; PLANT ECOLOGY; PLANT PATHOLOGY; PLANT PHYSIOLOGY, PLANT TAXONOMY, PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL; VERTEBRATE ZOOLOGY. *See also* SANITARY ENGINEERING

Biophysics

Aberration, optical. Autoradiography. Aviation medicine. Behavioral psychophysics Biological effects of sound waves Biophysics Biophysics, mathematical. Biopotentials and electrophysiology Birefringence. Bone (biophysics). Cell-surface ionization Chromatic aberration Cybernetics. Cytology (molecular basis) Decompression illness Dichroism Electrocardiography Electrodiagnosis Electroencephalography Electromagnetic radiation. Electromyogram Electrophysiology (heart). Electrotherapy. Gas dynamics. Gravity Health physics Historadiography Information theory (biological applications) Infrared radiation (biology) Linear energy transfer (biology) Mechanoreceptors. Micromanipulation Microscope. Microscope, centrifuge. Microscope, electron Microscope, fluorescence Microscope, interference Microscope, optical Microscope, phase contrast Microscope, reflecting Microscope, x-ray. Molecular biophysics Muscle (biophysics). Nuclear radiation (biology) O[illegible]

[illegible]

ogy. Radiation injury (biology) Radiation microbiology Radioactivity (applications) Radioisotope (biology) Radiology. Respiration, external Space biology Spirometry. Symballophone. Thermodynamic principles. Thermodynamic processes. Thermotherapy. Ultraviolet radiation Ultraviolet radiation (biology). Vectorcardiography. Weightlessness

For applications in other fields *see* ACOUSTICS; ANIMAL PATHOLOGY; FLUID MECHANICS.

Botany

See AGRICULTURE; BIOCHEMISTRY; CONSERVATION; CYTOLOGY; FORESTRY; MICROBIOLOGY; PALEOBOTANY; PLANT ANATOMY; PLANT ECOLOGY; PLANT PATHOLOGY; PLANT PHYSIOLOGY; PLANT TAXONOMY.

Chemical engineering

Abrasive. Adhesive, structural. Agricultural chemistry. Agricultural science. Amination Anemometer. Animal-feed composition Autoclave. Bergius process Bleaching Boiler feed water. Boiler water Boundary-layer flow. Boyle's law. Brick. Cement. Cement-asbestos Cetane number. Centrifugal pump. Centrifugation. Ceramic technology. Charcoal Charles' law. Chemical engineering Chemical fuel Chemical process control Chemical warfare. Chemurgy. Clarification. Classification, mechanical Clay Clay minerals. Clay products architectural Coal chemicals. Coal gasification. Coke. Combustion Combustion chamber. Combustion knock Concrete. Condenser, vapor Conservation of energy Contact condenser. Cooling tower. Crystallization Cyanoethylation. Defoliant. Dehumidifier. Dehydrogenation Desiccant. Destructive distillation Detonator Diffusion in gases and liquids. Dimensional analysis Displacement pump Drier (paint) Drying Dust and mist collection Dyeing Economizer and air heater. Electrochemical process [illegible]

Evaporator Explosion and explosive. Explosive forming Feed water Fertilizer Fertilizing Fiber, man-made Fiber, natural. Filler. Filtration. Fire detector Fire extinguisher. Fischer-Tropsch process. Fission, nuclear. Flame. Flameproofing. Flax. Floriculture. Flow measurement Flow of fluids Fluid dynamics Fluid mechanics. Fluid statics Fluid-flow principles. Fluid-flow properties. Fluidization of solids. Food engineering. Food manufacturing Forest fire control. Fossil fuel. Frit. Fuel. Fuel gas. Fuel gas supplements Fumigant. Furnace (steam generating). Furnace construction. Fuse, explosive Gas absorption operations. Gas furnace Gas mask. Gibberellin. Glass and glass products Glazing Halogenation Heat exchanger. Herbicide. High-pressure physics High-pressure processes [illegible]
control
lation. H
esses. H [illegible] Hygrometer. Ice manufacture. Incendiary. Imhoff tank. Impulse generator. Incompressible flow. Insecticide Isothermal process Isotope separation (stable isotopes). Japanning Jet flow. Kiln. Lacquer. Laminar flow. Leaching. Leather and fur processing. Lignite. Lime (industrial). Magnetic separation

Automotive engineering

See MECHANICAL ENGINEERING.

Bacteriology

Ablastin. Achromobacteraceae. Acid-fast stain. Actinomycetaceae Actinomycetales Actinoplanaceae. Aerobacter. Agglutination reaction. Agglutinin. Anthrax. Antibacterial agents. Antibiotic. Antibody. Antigen. Antigen-antibody reaction. Antiseptic. Antitoxin. Azotobacteraceae. Bacillaceae. Bacillary dysentery. Bacteria. Bacteria, lysogenic. Bacteria, *taxonomy of. Bacterial cell* chemistry. Bacterial coenzyme. Bacterial endospores. Bacterial enzyme. Bacterial genetics. Bacterial growth. Bacterial luminescence. Bacterial metabolism Bacterial motility. Bacterial nutrition. Bacterial physiology. Bacteriology. Bacteriology, medical. Bacteriophage. *Bacteroidaceae Beggiatoales. Biological* specificity. Biologicals. Blood-plate hemolysis. Botulism. Brevibacteriaceae. Brucellaceae. Brucellosis. Caryophanales. Caulobacteraceae. Chemotherapy. Chlamydobacteriales. Cholera vibrio. Coliphage. Complement (serum) Complement-fixation test. Conglutination. Corynebacteriaceae. Culture, *elective. Culture, media components of. Culture,* pure Culture technique. Cystitis Diphtheria Disease carrier. Drug resistance. Effective dose 50. Endocarditis. Enteric bacilli Enterobacteriaceae Epidemic. Epidemiology Escherichia. Fermentation. Food poisoning, bacterial. Food preservation Food spoilage. Foot and mouth disease. Gaffkya tetragena Gangrene, gas Germ. Glanders Gonorrhea Gram's stain. Gram-negative diplococci. Hemophilic bacteria. *Hemorrhagic septicemia. Heterophile* antigen Humus. Hyaluronidase. Hyphomicrobiales Immunity. Immunology. IMViC test. Infant diarrhea Infectious disease control. Infective dose 50 Isoantigen. Isonicotinic acid hydrazide Johne's disease. Klebsiella pneumoniae. Lactobacillaceae Lancefield differentiation scheme. Leprosy Leptospira. Lethal dose 50. Leukocidin. Lyophilization. Lysin. Lytic reaction. Mastitis (cows) Melioidosis Meningitis Meningococcus Methanomonadaceae. Micrococcaceae. Moraxella lacunata. Mycobacteriaceae Mycoplasmatales Myxobacterales. Neisseriaceae Neutralization reaction (antibody) *Neutralizing antibody* Nitrobacteriaceae. Nitrogen cycle. Opsonin. Paracolon bacilli. Parapertussis. Paratyphoid fever. Paratyphoid gastroenteritis. Pasteurization. Pathogen (soil). Phagocytosis. Pink eye. Pinta Plague. Pleuropneumonia-like organism (PPLO). Pneumococcus. Pneumonia. Precipitin. Precipitin test. Properdin. Propionibacteriaceae. Proteus. Pseudomonadaceae. Pseudomonadales. Pseudomonadineae Pseudomonas aeruginosa. *Pseudotuberculosis.* Public health Quellung reaction. Rat-bite fever. Relapsing fever. Rheumatic fever. *Rhizobiaceae.* Rhodobacteriineae. Salmonella. Scarlet fever. Schizomycetes Septicemia Serology. Shigella Siderocapsaceae. Skin test. Soft chancre. Spirillaceae. Spirochaetales. Spirochete. Stain (microbiological). Sterilization. Streptomycetaceae. Syphilis. Thiobacteriaceae. Tuberculariaceae. *Tuberculosis. Tularemia. Typhoid fever.* Vaccination. Venereal disease. Vincent's angina. Virulence. Water analysis. Water-borne disease. Weil's disease. Whooping cough. Zoonoses.

For more articles on the chemistry of the physiological processes *see* BIOCHEMISTRY. For information on the role of bacteria in plant disease *see* PLANT PATHOLOGY; for information on the role of bacteria in water and sewage *see* SANITARY ENGINEERING.

See also MEDICAL MICROBIOLOGY; MICROBIOLOGY.

Biochemistry

Acetyl phosphate *Acetylcholine. Adenosinediphosphate* (ADP). Adenosinetriphosphate (ATP). Adenylic *acid. Adrenal cortex steroid. Adsorption* Alanine. Albumin. Aldosterone Amino acids para-Aminobenzoic acid. Amphoterism. Amylase. Androgen. Arginine. Ascorbic acid Asparagine. Aspartic acid. Auxin. Bile acid Bilirubin. Biochemistry. Biological oxidation Biotin. Blood Buffer solution Calcium metabolism Carbohydrate. Carbohydrate *metabolism Carboxylic acid Carotenoid. Catalysis.* Cetyl alcohol. Chelation. Chemical energy. Chemical warfare. Chitin. Chlorophyll. Cholesterol. Choline. Coacervation. Coenzyme. Colloid. Creatine-creatine. Cysteine. Cystine. Cytochemistry. Cytochrome. Dextrin. Dialysis. Digitoxigenin. Diphosphopyridine nucleotide (DPN). Donnan equilibrium. Electrophoresis. Enantiomorph. Enzyme. Enzyme inhibition. Epinephrine. Equilibrium, *chemical Equilibrium,* ionic *Equilibrium,* phase Ergosterol. Estrogen Fibrinogen. Flavone Folic acid Fructose Galactose. Gamma globulin. Gel. Globulin. Glucose. Glucose-1-phosphate. Glucose-6-phosphate. Glutamic acid. Glutamine Glutelin. Glycine Glycogen. Glycolipid Gonad Hemoglobin. Histidine. Hormone Hormone, adenohypophyseal. Hormone, adrenal cortex Hormone, adrenal medullary Hormone, neurohypophyseal. Human genetics. Hyaluronic acid. Hydrogen bond. Hypophysis. Inositol Insulin Interface of phases. Inulin. Ion-permeable membrane Iron metabolism. Isoelectric point Isoleucine. Krebs cycle. Lactase Lactose. Leucine Levan Lipid. Lipid metabolism Lysine Maltase Maltose. Metabolic disorders. Metabolism. Metabolism in ruminants Methionine. Monosaccharide Niacin. Nucleic acid Nucleoprotein Nutrition. Oligosaccharide Oncology Pancreas. Pantothenic acid Peptide. Phenylalanine Phosphate metabolism Phosphatide Photochemistry Plasmal. Polysaccharide. Porphyrin. Progesterone. Prolamine. Proline Protein. Protein, fibrous Protein, globular. Protein metabolism. Pyrimidine. Pyrrole. Racemization. Radiation biochemistry. Raffinose. Riboflavin. Serine. Serotonin. Serum Specialized tissue. Sphingolipid. Squalene Steroid Sterol. Sucrose Surface phoenomenon. Surface ten-

Gravitation Gravity Group velocity. Hamilton's equations of motion. Hamilton's principle Hamilton-Jacobi theory Harmonic (periodic phenomena) Harmonic motion Harmonic oscillator. Horsepower. Hydrometer Hypothesis Impact (impulsive force) Impedance, mechanical. Impulse (mechanics). Inertia. Jet propulsion Kilogram Kinematics. Kinetics (classical mechanics). Lagrange's equations Lagrangian function. Least action principle of. Length Level measurement. Lissajous figures. Manometer. Mass. Matter (physics). McLeod gage Mean free path. Measure Mechanical vibration. Mechanics Mechanics, classical. Meter (units) Metric system Micron Minimal principles Missile Mode of vibration. Moment of inertia Momentum Motion Motion, rectilinear Newton Newton's laws of motion Nutation (astronomy and mechanics). Oscillation. Particle Pendulum Period (periodic phenomena). Periodic motion Perpetual motion Perturbation (quantum theory). Phase (periodic phenomena) Phase velocity Physical law Physical measurement Physical science Physics Poinsot's method Postulate Potentials (physics) Pound Poundal. Power. Precession Pressure. Pressure transducer Product of inertia Radiation. Radius of gyration Relative motion Re-

sult

Rot.

Sine .

Stat

thetic vibration Theorem Theory, physical Time constant Torque Trajectory Tuning fork Units systems of. Vacuum measurement Velocity Vernier Vibration Vibration damping Virtual work principle of Wave (physics) Wave equation Wave motion Wavelength Weight Weight measurement Work

For engineering applications *see* ENGINEERING MECHANICS For statistical, relativistic, and quantum mechanics *see* ATOMIC PHYSICS; MOLECULAR PHYSICS; SOLID-STATE PHYSICS, THEORETICAL PHYSICS

Climatology

See METEOROLOGY AND CLIMATOLOGY

Communications

Airborne radar Altimeter radio Amateur radio Amplitude modulation Amplitude modulation detector Amplitude-modulation radio Amplitude modulator Angle modulation Antenna (aerial) Audio amplifier Automatic frequency control (AFC) Automatic gain control (AGC) Bandwidth requirements (communications) Carrier. Cascode amplifier Cavity resonator Choke (filter) Closed circuit television Coaxial cable. Color television Communications, electrical Communications systems protection Communications systems (traffic) design. Compass, radio Continuous-wave radar. Corner reflector antenna Counting circuit Crosstalk Data transmission. Decca. Dectra. Demodulator. Detector. Directional coupler. Direction-finding equipment. Discriminator. Distortion (electronic circuits). Doppler radar. Echo box Electronic countermeasures. Equalization, frequency-response. Facsimile. Fidelity. Filter, electric. Frequency modulation Frequency-modulation detector Frequency-modulation radio. Frequency modulator. Ground controlled-approach system (GCA). Ground-position indicator (GPI). Heterodyne principle High fidelity. Hyperbolic navigation system. Image orthicon. Impedance matching. Inertial guidance system. Information theory. Intercommunicating system. Interference, electrical Intermediate-frequency amplifier. Jamming Kinescope. Loran Loudspeaker. Microphone. Microwave Microwave optics Microwave transmission lines Mixer Modulation Modulator Monopulse radar Moving-target indication Multiplexing Navarho Navigation systems, electronic. Noise, electrical. Noise filter, radio Noise generator electrical Omega Passive radar. Phase modulation Phase-modulation detector Phase modulator Polar-coordinate navigation systems Precision approach radar (PAR). Privacy systems (scrambling) Pulse modulation Pulse modulator Radar Radio Radio broadcasting Radio broadcasting networks Radio range Radio receivers Radio spectrum allocations. Radio transmitter. Radio-wave propagation Radome Scaling circuit Selectivity Sensitivity Signal-to-noise ratio Shielding electrical Sideband Sound reproduction systems, electrical Static. Superheterodyne receiver. Suppression Suppressor. Surveillance radar Switching circuit Switching systems (communications) Switching theory. Switching tubes Systems engineering Tacan Telecast Telegraphy Telemetering Telephone Telephone civil defense system Telephone private branch exchange (PBX) Telephone service. Telephone signaling special subscriber Telephone systems construction Telephony. Telephotography Teletypesetter Teletypewriter Teletypewriter exchange (TWX) service Television. Television camera Television camera tube Television networks Television receiver Television scanning Television standards Television studio Television transmitter Telex. Terrain-clearance indicator Transmission lines Transmission theory and methods Tuner Tuning Underwater telephone Video amplifier Vortac Wave guide. Yagi antenna.

For articles on basic electron devices and circuits *see* ELECTRONIC ENGINEERING. For electrical circuit theory *see* ELECTRICAL ENGINEERING. For electromagnetic radiation phenomena *see* ELECTROMAGNETIC RADIATION For transmission of information by sound waves *see* ACOUSTICS For electronic navigation equipment *see* NAVIGATION. For aspects of human communication through printing and other visual means *see* GRAPHICS AND GRAPHIC ARTS; PHOTOGRAPHY

methods. Mass-transfer operation. Metric system. Miticide. Mixing. Mortar. Naval stores. Navier-Stokes equation. Nematocide. Newtonian fluid. Nitration. Nitrogen fixation. Nuclear engineering. Nuclear fuels. Nuclear fuels reprocessing. Oxidation process. Paint. Paper and paper products. Particle accelerator. Particle detector. Particle properties. Pesticide Photographic materials. Photography. Pigment. Pine oil. Pipe flow. Pitot tube. Plant, water relations of. Plant translocation (organic solutes). Plaster. Plaster of paris Plastics fabrication. Porcelain. Pottery. Prilling. Primer (explosive). Primer (surface coating). Propellant. Pyrolysis Pyrometric cone Pyrotechnics. Refractory. Refrigeration Refrigeration cycle. Reynolds number. Rheology. Rodenticide Roll mill. Rosin oil Rubber. Rubber products. Safety glass. Saline water reclamation Screening. Screening smoke Sea water. Sedimentation (industrial). Separation (mechanical). Septic tank. Sewage treatment. Shaped charge. Shellac. Sintering. Size reduction. Smoke. Solar energy. Solids pump. Solvent extraction Spinning (textile). Stained glass. Stripping. Sulfonation. Surface coating. Terra cotta Textile. Textile chemistry. Textile microbiology. Textile printing Thickening Thinner Tile Transesterification. Turbulent flow. Unit, systems of. Unit operations Unit processes. Varnish. Varnish tree Ventilation. Water power. Water softening Water treatment Wind power Wood chemicals. Wood fiber products Wood finishing Zipper.

For applications of agricultural chemistry *see* AGRICULTURE. For construction applications *see* CIVIL ENGINEERING For unit operation and unit processes production applications *see* INORGANIC CHEMISTRY, MICROBIOLOGY; MINING ENGINEERING; NUCLEAR ENGINEERING; NUCLEAR PHYSICS, PETROLEUM CHEMISTRY. For the theoretical aspects of this subject *see* PHYSICAL CHEMISTRY

Chemistry

See ANALYTICAL CHEMISTRY; BIOCHEMISTRY; CHEMICAL ENGINEERING, INORGANIC CHEMISTRY; ORGANIC CHEMISTRY, PETROLEUM CHEMISTRY; PHYSICAL CHEMISTRY

Civil engineering

Air-entraining portland cement. Airport engineering. Alidade. Arch. *Architectural acoustics*. Architectural engineering. Azimuth Beam. Beam column Blasting. Bolted joint Breakwater. Bridge. Bridge vibration Brittleness. Buildings. Bulkhead Bulldozer. Caisson foundations. Canal. Cantilever Cement. Cement-asbestos. Chimney. Civil engineering Clinometer. Coastal engineering. Cofferdam Column. Composite beam. Concrete. Concrete beam. Concrete column Concrete slab Construction engineering. Construction equipment. Construction methods. Contour. Crane hoist. Dam. Derrick Dredge. Earthmover Electroosmotic dewatering. Engineering and architectural contracts. Engineering geology. Excavator. Floor construction. Foundations. Furnace construction Girder, plate. Grab bucket. Groin (engineering). Grout. Gunite. Gypsum plank Harbor. Highway engineering. Imhoff tank. Industrial meteorology. Inland waterways transportation. Jetty. Joint (mechanical). Level (surveying). Loading, transverse. Loads, dynamic. Loads, repeated. Lumber manufacture. Masonry. *Noise control in buildings*. Pavement. Photogrammetry. Pier. Pile driver. Pile foundation. Pipeline. Plane table. Plate, structural. Portland cement. Precast concrete. Prestressed concrete. Railroad engineering. Reinforced concrete. Reservoir. Retaining wall. Revetment. River engineering. Riveted joint. Roof construction Runway, airport. Safety factor. Sanitary engineering. Sea wall Septic tank. Sewage. Sewage collection systems. Sewage disposal. Sewage solids Sewage treatment. Shovel. power. Soil mechanics. Stadia Structural analysis. Structural connections. Structural deflections. Structural materials. Structural steel Structures (engineering) Surveying. Tank. Theodolite. Topographic surveying and mapping Tower Traffic engineering Transit (engineering). Transportation engineering Trestle. Truss Tunnel Unloader. Wall construction. Water conservation. Water pollution. Water softening Water supply *engineering*. *Water treatment*. *Welded joint*. *Wellpoint systems* Wharf. Wood *fiber products* Wood finishing Wood physics Wood preservation

For mechanics and properties of materials *see* ENGINEERING MECHANICS. For hydraulics articles *see* FLUID MECHANICS For mapping articles *see* PHYSICAL GEOGRAPHY. For related articles in the fields of geology and hydrology *see* ENGINEERING GEOLOGY; GEOLOGY (SURFICIAL AND HISTORICAL); HYDROLOGY

Classical mechanics

Acceleration Acceleration measurement. Amplitude (wave motion). Angular frequency. Angular momentum. Anharmonic oscillator. Antigravity. Art. science in Balance (weighing instrument). Ballistics, exterior Ballistics, interior. Beat. Bourdon-spring pressure gage. Canonical transformations Cayley-Klein parameters Celestial mechanics. Center of gravity. Center of mass. Center of pressure. Centrifugal force Centripetal force. Centrode *Centroids of areas and lines* Collision. Conservation of energy Conservation of momentum. Constraint. Couple. D'Alembert's principle. Damping Degree of freedom (mechanics) Density Density measurement. Dimensional analysis. Dimensions (mechanics) Displacement (mechanics). Doppler effect. Dynamics. Dyne. Earth. Empirical method. Energy. *Equilibrium of forces* Erg Euler angles. Euler's equations of motion. Foot (unit). Foot-pound. Foot-poundal. Force Forced oscillations Foucault pendulum. Frame of reference. Free fall. Frequency (wave motion). Fundamental frequency. Galilean transformations. Gas Gram.

For analog and digital computers and for data processing equipment see COMPUTERS AND INFORMATION PROCESSING. For basic electrical circuitry and components see ELECTRICAL ENGINEERING. For electronic circuits and components see ELECTRONIC ENGINEERING. For mechanical, hydraulic and pneumatic devices see MECHANICAL ENGINEERING.

Cryogenic engineering

See CHEMICAL ENGINEERING.

Cytology

Autoradiography. Cell (biological). Cell (pressure-temperature effects). Cell constancy. Cell division. Cell inclusions, noncytoplasmic. Cell lineage. Cell membranes and monolayers. Cell nucleus. Cell organization. Cell plastids. Cell protoplast. Cell structures. Cell walls in plants. Cell-surface differentiation. Cell-surface ionization. Centriole. Centrosome. Chromosome. Chromosome aberration. Chromosome theory of heredity. Cytochemistry. Cytokinesis. Cytology. Cytology (molecular basis). Cytoplasm. Cytoplasmic inheritance. Deoxyribonucleic acid. Gene. Gene action. Golgi component. Lethal gene. Meiosis. Microscope. Microscope, electron. Microscope, fluorescence. Microscope, interference. Microscope, optical. Microscope, phase contrast. Microtechnique. Mitochondria. Mitosis. Mutation. Oogenesis. Polyploidy. Protoplasm. Recombination, genetic. Ribonucleic acid. Sex determination. Sperm cell. Spermatogenesis.

For more information on the chemistry of various physiological processes see BIOCHEMISTRY; for further information on cells in tissues see HISTOLOGY.

Ecology

See ANIMAL ECOLOGY; PLANT ECOLOGY.

Electrical engineering

Admittance. Alternating current. Alternating-current circuit theory. Alternating-current generator. Alternating-current motor. Alternator. Ammeter. Amplifier. Antiresonance. Arc heating. Arc lamp. Arc welding. Armature reaction. Attenuator. Audio amplifier. Autotransformer. Backward-wave tube. Ballast resistor. Battery (electric). Beam power tube. Bias (electron tube). Blocking oscillator. Blowout coil. Bonding. Bootstrap circuit. Brake. Branch circuit. Breadboarding. Breakdown. Bridge circuit. Bus-bar. Calibration. Candle. Candlepower. Capacitance box. Capacitance measurement. Capacitor. Cascode amplifier. Cathode follower. Cathode-ray tube. Cell (electric). Choke (filter). Chopper. Circuit, electric. Circuit, electronic. Circuit breaker. Circuit testing, electrical. Clamping circuit. Clipping circuit. Clutch. Coaxial cable. Cockcroft-Walton accelerator. Coil. Coincidence amplifier. Communications, electrical. Communications systems protection. Commutation. Commutator. Comparator circuit. Conductance. Conductor, electric. Connector, electric. Contact, electric. Contact rectifier. Controlled rectifier. Converter, synchronous. Copper loss. Core loss. Corona discharge. Coupled circuits. Current balance. Current measurement. Crosstalk. Cryosar. Cryotron. Data transmission. Delay line. Dielectric heating. Digital voltmeter. Diode, semiconductor. Diode, vacuum. Direct current. Direct-coupled amplifier. Direct-current circuit theory. Direct-current generator. Direct-current motor. Distortion (electronic circuits). Dry cell. Dynamic braking. Dynamo. Dynamometer. Edison battery. Electric distribution systems. Electric energy measurement. Electric furnace. Electric power generation. Electric power measurement. Electric power substation. Electric power systems. Electric protective devices. Electric rotating machinery. Electrical codes. Electrical degree. Electrical engineering. Electrical measurements. Electrical standards. Electroacoustics. Electrodynamic instrument. Electrokinetic transducer. Electrolytic tank. Electromagnet. Electromagnetic pump. Electrometallurgy. Electrometer. Electron lens. Electron tube. Electronic writing. Electronics. Electroplating of metals. Electropolishing. Electrostatic lens. Electrostatic precipitator. Energy sources. Equivalent circuit. Esaki tunnel diode. Excitation. Excitron. Facsimile. Feedback circuit. Fidelity. Filter, electric. Flash welding. Fluorescent lamp. Fluxmeter. Footcandle. Foot-lambert. Frequency divider. Frequency measurement. Frequency multiplier. Fuel cell. Fuse, electric. Gain. Galvanometer. Gas tube. Gate circuit. Generator, electric. Grounding, electrical. Grounding, electronic equipment. Harmonic analyzer. Heating, electric. Heptode. Hexode. Hydroelectric generator. Hysteresis motor. Ignitron. Illuminance. Illumination. Impedance matching. Impedance measurements, high-frequency. Impulse generator. Incandescent lamp. Inductance bridge. Inductance measurement. Induction coil. Induction heating. Induction motor. Inductometer. Inductor. Infrared image converter tube. Infrared lamp. Instability, electrical. Instrument transformer. Instrumentation. Insulation, electric. Insulation resistance testing. Intercommunicating system. Interference, electrical. Intermediate-frequency amplifier. Inverter. Ionization gage. IR drop. Junction diode. Junction transistor. Kelvin bridge. Kirchhoff's laws of electric circuits. Klystron. Lambert. Lamp (electric). Light panel. Light amplifier. Lighthouse tube. Lightning and surge protection. Lightning arrester. Lightning rod. Limiter circuit. Linear accelerator. Linearity. Lissajous figures. Load line. Loading, electrical. Loudspeaker. Lumen. Lumen-hour. Luminaire. Luminance. Luminosity factor. Luminous efficiency. Luminous energy. Luminous flux. Luminous intensity. Lux. Magnet wire. Magnetic amplifier. Magnetic lens. Magneto. Magnetron. Mechanical rectifier. Megger. Mercury battery. Mercury-vapor lamp. Mercury-vapor rectifier.

Comparative physiology

Acetyl phosphate. Acetylcholine. Adenosinediphosphate (ADP). *Adenosinetriphosphate (ATP).* Adenylic acid. Adrenal cortex steroid. Adrenal gland. Alanine. Albumin. Aldosterone. Amino acids para-Aminobenzoic acid. Amylase. Androgen. Animal growth. Arginine. Ascorbic acid. Asparagine. Aspartic acid. Autotomy. Bile acid. Bilirubin. Biochemistry. Bioelectric model. Biological oxidation. *Bioluminescence. Biotin. Blood. Blood groups.* Calcium metabolism. Carbohydrate. Carbohydrate metabolism. Cardiovascular system. Cell (pressure-temperature effects). Cell membranes and monolayers. Centrifugation (biology). Cetyl alcohol. Chemoreception. Chitin. Cholesterol Choline. Chromatophore. Circulation. Coenzyme. Creatine-creatinine. Cysteine. Cystine. *Cytochrome.* Dextrin. Digestive system. Digitoxigenin. Diphosphopyridine nucleotide (DPN). Electric organ (biology). Endocrine mechanisms Endocrinology. Enzyme. Enzyme inhibition Ephaptic transmission. Epinephrine. Equilibrium, biological. Ergosterol. Estrogen. Excretion. Feces. Feeding mechanisms and digestion. Fibrinogen. Folic acid Fructose. Galactose. Gallbladder. Gamma globulin Gestation period. Globulin. Glucose. Glucose-1-phosphate. Glucose-6-phosphate. Glutamic acid. Glutamine Glutelin. *Glycine. Glycogen Glycolipid. Gonad.* Heart (ganglionic pacemaker) Hemoglobin. Hibernation. Histidine. Homeostasis. Hormone Hormone, adenohypophyseal. Hormone, adrenal cortex. Hormone, adrenal medullary. Hormone, neurohypophyseal. Hyaluronic acid Hypophysis. Inositol. Insect physiology. Insulin. Inulin Iron metabolism *Isoleucine Krebs cycle.* Lactase *Lactation* Lactose. Leucine Levan Lipid. Lipid metabolism Liver. Lymphatic system. Lysine. Maltase Maltose Menstruation. Metabolism Metabolism in ruminants. Methionine. *Microscope, centrifuge* Monosaccharide. Muscular system. Nervous system. Nervous system (invertebrate) Niacin Nitrogen excretion. Nucleic acid. Nucleoprotein. Nutrition. Oligosaccharide Oncology Osmoregulatory mechanisms Ovary. Pancreas. Pantothenic acid. Parathyroid gland. Peptide. Periodicity in organisms. *Phenylalanine Phonetics Phonoreception* Phosphate metabolism. Phosphatide. Photoreception. Physiological acoustics Physiology, general. Plasmal Polysaccharide. Porphyrin Progesterone Prolamine. Proline. Protein Protein, fibrous Protein, globular Protein metabolism Raffinose. Regeneration (biology). Reproductive system Respiration Respiratory pigments. Respiratory system Riboflavin Serine. Serotonin. Serum Sight. Skeletal system Specialized tissue. Speech. Sphingolipid Steroid. Sterol. Sucrose. Synaptic transmission. Taxis. Testis. Thermoregulation. Thiamine Threonine Thyroid gland Transamination. Triglyceride Triphosphopyridine nucleotide (TPN). Tryptophan. Tyrosine. Urea (biochemistry). Uric acid. Uridine diphosphoglucose (UDPG). Urinary system Urine. Valine. Vitamin. Vitamin A. Vitamin B_6. Vitamin B_{12}. Vitamin D. Vitamin E. Vitamin K. Vocoder.

For physiological aspects of certain groups of plants *see* MICROBIOLOGY; PLANT PHYSIOLOGY; for certain behavioral aspects of vertebrates *see* PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL.

See also GENERAL PHYSIOLOGY.

Computers and information processing

Abacus. Analog computer. Analog-to-digital converter. Binary number system. Bit. Boolean algebra. Calculating machines. Cam mechanism. Computer. Counter, digital. Counting circuit. Data processing systems. Data reduction Data transmission Decimal number system. Differential analyzer. *Digital computer. Digital computer programming.* Digital-to-analog converter. Dynamic analogies. Electrolytic tank Gate circuit. Information theory. Magnetic recording. Microcircuitry. Number systems. Octal number system. *Pulse generator.* Scaling circuit. Simulator. Slide rule Storage devices. Switch, electronic. Switching circuit Switching theory. Switching tubes

For applications of computers, see the particular field of interest. For use of computers with automatic control systems *see* CONTROL SYSTEMS ENGINEERING.

Conservation

Conservation of resources. Ecology, applied Fisheries conservation. Forest conservation. Land use planning. Mineral resources conservation Range land conservation Soil conservation. Water conservation Wildlife conservation.

For economic aspects *see* AGRICULTURE; FORESTRY, for environmental aspects *see* ANIMAL ECOLOGY, PHYSICAL GEOGRAPHY.

Control systems engineering

Accelerometer. Alarm systems. Automation. Autopilot. Chemical process control Clock control systems Closed-loop control system Computer control system. Control systems. Cybernetics. Damping. Environmental test. Feedback circuit Feedback control systems Fire-control systems. Governor. Guidance systems Guided missile Humidity control. Hunting Hydraulic actuator. Magnetic amplifier Maintainability of equipment Microcircuitry. *Miniaturization of equipment.* Missile guidance systems Open-loop control system. Operations research Operator training Packaging of equipment Pressure control, automatic. Process control Prototype (equipment) Qualification test Regulator. Reliability of equipment. Remote-control system. Repeater, synchro. Sampled-data control system. Saturable reactor. Servomechanism. Synchro Systems engineering. Telemetering. Temperature control, automatic. Traffic control systems. Tracer, radioactive.

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Accelerometer. Alarm systems. *Automation. Autopilot.* Chemical process control. Clock control systems. Closed-loop control system. Computer control system Control systems Cybernetics. Damping. Environmental test. Feedback circuit. Feedback control systems. Fire-control systems. Governor. [illegible] control [illegible] amplifi[illegible] circuitry *Miniaturization of equipment* Missile guidance systems. Open-loop control system. Operations research. Operator training. Packaging of equipment. Pressure control, automatic. Process control. Prototype (equipment). Qualification test. Regulator. Reliability of equipment. Remote-control system Repeater, synchro. Sampled-data control system Saturable reactor. Servomechanism. Synchro. Systems engineering. Telemetering *Temperature control, automatic. Traffic control* systems Tracer, radioactive.

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Metallic-disk rectifier. Microcircuitry. Microphone. Microphonic tube. Microwave tube. Mixer. Motor, electric. Motorboating. Motor-generator set. Multimeter. Multivibrator. Neon glow lamp. Neper. Network theory, *electrical.* Nuclear battery. Nuclear power. Number indicator tube Octode. Ohm's law. Ohmmeter. Open circuit. Oscillator. Oscillograph. Oscilloscope, cathode-ray. Parallel circuit. Parametric amplifier. Parasitic oscillation. Particle accelerator. Pentagrid converter. Pentode, vacuum. Phase inverter. Phase meter. Phase-angle measurement. Phot. *Photoflash lamp. Photometer. Photometry.* Phototube. Phototube, multiplier. Point-contact diode. Point-contact transistor. Potentiometer (variable resistor). Potentiometer (voltage *measurement). Power amplifier. Power factor meter.* Power plant. Power supply, electronic. Preamplifier. Pressure transducer. Printed circuit. Prony brake. Pulse generator. Push-pull amplifier. Q meter. Quadrature. Radio-frequency amplifier. Reactor, electric. Recording instruments, graphic. Rectifier. Regeneration (engineering) Regulation. Relaxation oscillator. Relay Reliability of equipment. Reluctance motor. Repulsion motor. Reserve battery. Resistance heating. Resistance measurement. Resistance welding. Resistor. Resonance (alternating-current circuits). Response. Rheostat. Ripple voltage. Rural electrification Saturable reactor. Saturation Saw-tooth wave Schematic drawing. Selectivity. Semiconductor rectifier Sensitivity *Series circuit. Shielding, electrical. Short circuit.* Shunting. Signal generator. Signal tracer Silicon diode. Slip Slip rings Sodium-vapor lamp Solar battery. Solar energy. Solenoid (electrical) Solion Speed regulation. Spot welding. Square wave. Stabilization. Storage battery Storage tube. Strain gage. Stroboscope. Sunlamp. Superposition theorem (electrical networks). Suppressor Surface-barrier transistor Surging Sweep generator. Switch, electric. Switch, electronic. Switching tubes. Synchro. Synchronization Synchronous condenser. Synchronous motor. Synchronous speed Synchroscope. Tachometer Tank circuit Telegraphy. Telemetering. Telephony. Telephotography Teletypesetter. Teletypewriter. Teletypewriter exchange (TWX) service Telex. Tetrode. vacuum Thermionic tube. Thermistor Thermocouple Thermometer. Thevenin's theorem (electrical networks). Thyratron Time constant. Time delay circuits. *Transducer* Transformer. Transient, electric. Transistor. Transistor connection. Transmission lines. Transmission theory and methods. Traveling-wave tube. Trigger circuit Triode, vacuum Tube. electron. *Tube tester. Ultraviolet lamp Universal* motor. Vacuum tube. Vacuum-tube voltmeter Van de Graff generator. Vapor lamp. Varactor Varistor. Vibration pickup. Vibrator. Video ampli- [illegible] *Voltage measurement Volt-* [illegible] Voltage-multi- [illegible] Volt-amperes [illegible] Water power. *Watt-hour meter.* Wattmeter. Waveform. Waveform, nonsinusoidal. Waveform determination. Wave-shaping circuits. Wet cell. Wheatstone bridge Wind power. Windings (electric machinery). Wire. Wiring (electric). Wiring diagram Y-delta transformations.

For electrical and electromagnetic phenomena and laws *see* ELECTRICITY AND ELECTROMAGNETISM. For electrochemical phenomena and laws *see* PHYSICAL CHEMISTRY. For electrical conduction in solids *see* SOLID-STATE PHYSICS. For *electrical conduction in gases and vacuum see* ELECTRONIC ENGINEERING. For applications of electrical engineering in other fields *see* COMMUNICATIONS; COMPUTERS AND INFORMATION PROCESSING; CONTROL SYSTEMS ENGINEERING; NAVIGATION. For generator prime movers *see* MECHANICAL ENGINEERING.

Electricity and electromagnetism

Admittance. Alternating current. Ammeter. Ampere. Ampere's law. Ampere-turn. Arc discharge. Attenuation Attenuator. Ballast resistor. Band theory of solids. Barkhausen effect. Barretter. Biot-Savart law. Bolometer. Breakdown potential. Brush discharge. Calomel electrode. Canal rays. Capacitance. Capacitance box. *Capacitance measurement.* Capacitor. Cathode rays. Cathodoluminescence Cell (electric). Characteristic curve Charge, electric Chopping. Coil Condenser, electrical. Con*ductance Conduction (electricity) Conductivity.* Coulomb. Coulomb's law. Current, electric. Current balance. Current density Current measurement Dark current. Degaussing Demagnetization. Dielectric constant. Dielectrics. Digital voltmeter. Dipole Dipole moment Direct current. Eddy current. Electret Electric energy measurement. Electric field Electric power measurement. Electrical conduction in gases. Electrical conductivity of metals Electrical measurements Electrical standards. Electrical units Electricity Electroacoustics. Electrochemical equivalent Electrochemical process. Electrochemical series Electrochemistry Electrode Electrode potential Electrodynamic instrument. Electrodynamics Electrokinetic phenomena Electroluminescence Electrolysis Electrolyte. Electrolytic conduction Electromagnetic field Electromagnetism. Electrometer Electromotive force (cells). Electromotive force (emf) Electron diffraction Electron emission Electron lens. Electron motion in gases. Electron optics Electroosmosis Electrophoresis Electroscope Electrostatic lens. Electrostatics Electrostriction Excitation. *Excitation potential.* Farad. Faraday's law of induction Ferroelectrics Field emission Field theory classical Field-enhanced emission Fluxmeter. Free-electron theory of metals Frequency counter. *Frequency measurement* Galvanometer. Gauss Germanium diode Gilbert Glass electrode Glow discharge. Harmonic analyzer. Helmholtz coil. Henry Hydrogen electrode. Hysteresis, magnetic.

Impedance electrical Impedance matching. Impedance measurements, high frequency. Inductance Inductance bridge. Inductance measurement Induction, electromagnetic. Induction, electrostatic. Induction, magnetic. Inductometer. Inductor Instrument transformer. Insulator, electric. Ionization. Ionization potential. Joule's law Kelvin bridge Kinetic theory of matter. Langmuir Child law Lenz's law. Lines of force Magnet Magnetic circuits Magnetic field Magnetic flux Magnetic moment. Magnetic lens. Magnetomotive force Magnetooptics Magnetostatics. Maxwell. Meissner effect. Mho Molecular electronics. Multimeter Oersted. Ohm Ohm's law. Ohmmeter. Oscillograph Oscilloscope, cathode-ray Overvoltage Permeability, magnetic. Permittivity. Phase (periodic phenomena) Phase meter. Phase-angle measurement Photoconductivity Photoelectricity. Photoemission. Photovoltaic effect Piezoelectricity Pinch effect. Plasma physics. Polar molecule Polarity (electricity) Polarization (dielectrics). Potential electric. Potential difference Potentials, physics Potentiometer (variable resistor). Potentiometer (voltage measurement) Power factor Power factor meter. Pyroelectricity. Q Q meter Reactance Reciprocity, principle of Recording instruments, graphic Reflectometer, microwave Regulation Relativistic electrodynamics. Reluctance Resistance electrical. Resistance measurement Resistivity, electrical Resistor Response. Rheostat Saint Elmo's fire Salt bridge Saturation Saturation current. Schottky effect. Search coil Secondary emission Semiconductor Skin effect Space charge Spark, electric. Spark gap. Spectrum analyzer Sputtering Standing-wave detector Static electricity Striation Superconductivity Susceptance Susceptibility, electric. Synchroscope Thermionic emission Thermistor Thermoelectricity Townsend discharge. Unified field theory Vacuum tube voltmeter. Varistor Volt. Voltage measurement Volt amperes. Voltmeter Volt-ohm-milliammeter Watt. Watt hour meter. Wattmeter. Waveform determination Wavelength measurement. Wavelength standards Wavemeter Weber Wheatstone bridge

For articles on electromagnetic radiation *see* ELECTROMAGNETIC RADIATION For fields of applied electrical physics *see* COMMUNICATIONS, COMPUTERS AND INFORMATION PROCESSING, CONTROL SYSTEMS ENGINEERING; ELECTRICAL ENGINEERING, ELECTRONIC ENGINEERING. For articles on biological electrical phenomena and applications *see* BIOPHYSICS

Electromagnetic radiation

Absorption. Absorption (electromagnetic radiation). Amplitude (wave motion) Angstrom Antenna (aerial). Band spectrum Birefringence Black body. Bremsstrahlung Cerenkov radiation Color centers Color temperature Compton effect. Conservation of mass. De Broglie wavelength. Diffraction. Dispersion (radiation). Displacement current. Doppler effect. Eigenfunction. Einstein shift. Electric field. Electromagnetic field. Electromagnetic radiation Electromagnetic wave. Electrooptics Emissivity. Energy level (quantum mechanics). Equation of continuity. Ether hypothesis Fine structure (spectrum lines). Franck Condon principle. Frequency (wave motion). Fundamental frequency. Gamma rays. Ground state Harmonic (periodic phenomena) Harmonic oscillator. Heat radiation Heat transfer Huygens' principle. Hyperfine structure. Incandescence. Inertia of energy. Infrared detector Infrared radiation Infrared spectroscopy Interference of waves. Interferometry Inverse square law. Isotope shift. Kinetic theory of matter Light Line spectrum Lines of force Magnetic resonance. Maser Maxwell's equations Micron Microwave Microwave optics. Microwave spectroscopy Oscillation Paschen Back effect Phase (periodic phenomena) Phase velocity Photon Planck's constant Planck's radiation law Point source Polarization of waves. Poynting's vector. Pyrometer Quantum (physics) Quantum electrodynamics Quantum field theory. Quantum mechanics Quantum statistics. Quantum theory, nonrelativistic Radiation Radiation pressure. Radio spectrum allocations Radio-frequency spectroscopy Radiometry Radiomicrometer Radio-wave propagation Reciprocity, principle of. Reflection (electromagnetic radiation). Reflection and transmission coefficients Reflectometer, microwave Refraction of waves Relativistic electrodynamics Ritz's combination principle. Roentgen unit Scattering (electromagnetic radiation). Schrodinger's wave equation Sine wave. Solar energy Spectrochemical analysis Spectrography. Spectroscopy Spectrum Spectrum analyzer. Standing wave detector Stationary state. Stationary wave Superposition, principle of Ultraviolet radiation Wave equation Wave motion Wave optics Wavelength Wavelength measurement. Wavelength standards Wavemeter. X ray(s), physical nature of X-ray diffraction. X-ray optics X-ray tube. X-unit Zeeman effect

For articles concerning the visible wavelengths *see* OPTICS For basic electrical phenomena *see* ELECTRICITY AND ELECTROMAGNETISM. For electronic phenomena and devices *see* ELECTRONIC ENGINEERING For uses of electromagnetic radiation for communications *see* COMMUNICATIONS

Electronic engineering

Acceptor atom Air traffic control Airborne radar. Aircraft low-approach systems Airport surface detection equipment Altimeter, radio Amateur radio. Ammeter Amplifier Amplitude-modulation detector Amplitude-modulation radio. Amplitude modulator Antenna (aerial) Arc discharge Arc lamp. Attenuator. Audio amplifier. Automatic frequency control (AFC) Automatic gain control (AGC). Backward-wave tube Barretter. Beam-power tube. Bias (electron tube) Blocking oscillator. Bolom-

eter. Bonding. Bootstrap circuit. Breadboarding. Breakdown potential. Bridge circuit. Brush discharge. Calibration. Canal rays. Capacitance box. Capacitance measurement. Capacitor. Cascode amplifier. Cathode follower. Cathode rays. Cathode-ray tube. Cavity resonator. Characteristic curve. Choke (filter). Chopping. Circuit, electronic. *Clamping circuit. Clipping circuit. Closed-circuit* television. Coaxial cable. Coil. Coincidence amplifier. Cold-cathode tube. Color television. Communications, electrical. Comparator circuit. Compass, radio. Conductance. *Conduction band.* Contact potential difference Contact rectifier. Continuous-wave radar. Controlled rectifier. Corner reflector antenna. Corona discharge. Counting circuit. Course-line computer. Crossover network. Crosstalk. Cryosar Cryotron. Current balance. Current measurement. Cyclotron resonance experiments. Dark current. *Data transmission. Decca. Dectra.* Delay line. Demodulator. Detector. Digital voltmeter. Diode, vacuum. Direct-coupled amplifier. Directional coupler. Direction-finding equipment. *Discriminator. Disk recording. Distortion (electronic circuits).* Donor atom Doppler radar Echo box. Electric energy measurement. Electric power measurement. Electrical conduction in gases. Electrical measurements. Electrical standards Electroacoustics. Electrodynamic instruments. Electrometer. Electron. Electron emission. Electron lens. Electron motion in vacuum. Electron optics. Electron tube. Electronic countermeasures. Electronic writing. Electronics. Electrostatic lens Equalization, frequency-response. Equivalent circuit. Esaki tunnel diode. Excitation Excitation potential. Excitron. Fascimile. Feedback circuit. Ferrite devices. Fidelity. Field emission. Field-enhanced emission. Filter, electric. Fluorescent *lamp. Frequency counter Frequency divider.* Frequency measurement Frequency modulator. Frequency multiplier. Frequency-modulation detector. Frequency-modulation radio. Gain. Galvanometer. Gas tube. *Gate circuit. Geiger-Müller counter.* Germanium diode. Glow discharge. Ground-controlled-approach system (GCA). Grounding, electronic equipment. Ground-position indicator (GPI). Gyrator. *Hall effect.* Harmonic analyzer. Hearing aid. Heptode. Heterodyne principle Hexode. High fidelity. Hyperbolic navigation system Ignitron. Image orthicon. Impedance, electrical Impedance matching. Impedance measurements, high-frequency. Inductance measurement. Inductometer. Inductor. Inertial guidance system. Infrared detector. Infrared image converter tube. Instability, electrical. Instrument landing system (ILS). Instrumentation. Intercommunicating system. Interference, electrical. Intermediate-*frequency* amplifier. Inverter. Ionization. Ionization chamber. Ionization potential. Jamming. Junction diode. Junction transistor. Kelvin bridge. Kinescope. Klystron. Langmuir-Child law. Lighthouse *tube.* Limiter circuit. Linearity. Lissajous figures. Load line. Loading, electrical. Loran. Magnetic lens. Magnetic recording. Magnetron. Maser. Meissner effect. Mercury-vapor lamp. Mercury-*vapor rectifier. Microcircuitry. Microphonic tube.* Microscope, electron. Microwave. Microwave optics. Microwave transmission lines. Microwave tube Miniaturization of equipment. Mixer. Modulator. *Molecular electronics* Monopulse radar. Motorboating. Moving-target indication. Multimeter. Multiplexing. Multivibrator. Navarho. Navigation systems, electronic. Neon glow lamp. Noise, electrical. Noise filter, radio. Noise generator, electrical. Number indicator tube. Octode Ohmmeter. Omega Oscillator. Oscillograph Oscilloscope, cathode-ray Packaging of equipment. Parametric amplifier. Parasitic oscillation. Particle detector. Passive radar. Pentagrid converter. Pentode, vacuum Phase inverter. Phase meter. Phase modu*lator. Phase-angle measurement. Phase-modulation* detector Photoconductive cell Photoconductivity. Photodiode Photoelectric devices. Photoelectricity. Photoemission Phototransistor. Phototube. *Phototube, multiplier Photovoltaic cell. Photovol*taic effect. Piezoelectric crystal. Piezoelectricity. Point-contact diode. Point-contact transistor. Polar-coordinate navigation systems. Potentiometer (variable resistor). Potentiometer (voltage measurement) Power amplifier. Power supply, electronic. Power-factor meter Preamplifier. Precision approach radar (PAR). Pressure transducer. Printed circuit. Privacy systems (scrambling). Pulse generator. Pulse modulator Push-pull amplifier Q meter. Quadrature. Quartz clock. Radar. Radio Radio astronomy. Radio broadcasting. Radio broadcasting networks. Radio range. Radio receivers Radio spectrum allocations Radio telescope Radio transmitter. Radioactivity (applica*tions) Radio-frequency amplifier Radio-wave* propagation Radome Recording. Recording instruments, graphic. Rectifier. Reflectometer, microwave. Regeneration (engineering). Regulation. Re*laxation oscillator Relay Reliability of equip*ment Resistance measurement. Resistor. Resonance (alternating-current circuits). Response. Ripple voltage. Saint Elmo's fire Saturation. Saturation current. Saw-tooth wave. Scaling circuit Schematic drawing Schottky effect Scintillation counter. Secondary emission Selectivity. Semiconductor Semiconductor rectifier Sensitivity Shielding, electrical Shunting Signal generator. Signal tracer Signal to-noise ratio Silicon diode. Sodium-vapor lamp Solar battery Sonar Sound recording Sound reproduction systems, electrical. Space charge. Spark, electric Spark gap Spectrum analyzer. Sputtering. Square wave Stabilization. Standing-wave detector. Static Storage devices. Storage tube. Striation Superconductivity. Superheterodyne receiver Suppression. Suppressor. Surface-barrier transistor. Surging. Surveillance radar. Sweep generator. Switch, electronic. Switching circuit. Switching theory Switching tubes. Synchro-

nization Synchroscope. Tacan. Tank circuit. Telecast. Telegraphy. Telemetering Telephone. Telephony. Telephotography. Teletypesetter. Teletypewriter. Teletypewriter exchange (TWX) service. Television Television camera. Television camera tube. Television receiver. Television scanning. Television transmitter Telex. Terrain clearance indicator. Tetrode, vacuum Thermionic emission. Thermionic tube. Thermistor. Thyratron. Time constant Time-delay circuits. Townsend discharge. Transducer. Transformer. Transistor. Transistor connection. Transmission theory and methods Traveling wave tube. Trigger circuit. Triode, vacuum Tube, electron Tube tester. Tuner. Tuning. Ultrasonics. Vacuum tube. Vacuum-tube voltmeter. Valence band. Varactor. Varistor. Video amplifier. Voltage amplifier. Voltage measurement Voltage regulator. Voltage-multiplier circuit. Voltage-regulator tube Voltmeter. Volt-ohm milliammeter. Vortac Wave guide. Waveform Waveform, nonsinusoidal. Waveform determination Wavelength measurement. Wavelength standards. Wavemeter. Wave-shaping circuit Wheatstone bridge. Wire recording Wiring diagram Work function (electronic) X-ray tube Yagi antenna

For a complete list of articles in the field of communications *see* COMMUNICATIONS For articles on computers *see* COMPUTERS AND INFORMATION *PROCESSING*. For electronic controls *see* CONTROL SYSTEMS ENGINEERING.

Embryology

See GROWTH AND MORPHOGENESIS. See also specific taxonomic *groups* of animals and plants listed under INVERTEBRATE ZOOLOGY, PLANT KINGDOM, VERTEBRATE ZOOLOGY.

Engineering

See specific *engineering fields*, such as CHEMICAL ENGINEERING; ELECTRICAL ENGINEERING; NUCLEAR ENGINEERING.

Engineering drawing

See GRAPHICS AND GRAPHIC ARTS.

Engineering geology

Aerial photograph Airport engineering Alidade Avalanche Blasting *Boring and drilling (mineral)*. Breakwater. Bridge Bulkhead Caisson foundations Canal Clay. *Clay* minerals Cleavage, rock Clinometer. Coastal *engineering*. Cofferdam Concrete Construction engineering. Construction equipment Construction *methods*. Dam. Delta. Dune. Earthquake Electroosmotic dewatering. Engineering *geology*. Erosion Exfoliation. Fault and fault structures. Flood plains. Foundations. Frost action *Geophysical* exploration Gravel. Grout (engineering) Ground water *Harbor*. Highway engineering. Hydrolaccolith Jetty Landslide Level (surveying). Loess Mass wasting *Pavement* Permafrost Photogrammetry Pier. Pile foundation Plane table. Railroad engineering. Regolith. Reservoir. Retaining wall. Revetment. River engineering Rock mechanics. Runway, airport. Sand Sea wall. Sedimentation (geology). Seismology. Sewage disposal. Shore processes. Snow surveying Soil mechanics. Solifluction. Stadia. Stone and stone products Structural geology. Structural petrology. Surface water. Surveying. Terrestrial frozen water. Theodolite. Till. Topographic surveying and mapping Transit (engineering). Transportation engineering Tunnel. Water supply engineering. Water table. Weathering processes. Wellpoint systems. Wharf.

For information on the composition and properties of minerals and solid rocks *see* GEOLOGY (MINERALOGY AND PETROLOGY); for articles treating loose sediments and geologic processes of importance in construction engineering *see* GEOLOGY (SURFICIAL AND HISTORICAL); for articles relating to the action of fluids on rock materials *see* HYDROLOGY. For articles on the stresses, strength, and elasticity of materials *see* ENGINEERING MECHANICS For aspects of boring, drilling, and excavation *see* MINING ENGINEERING; PETROLEUM ENGINEERING

Engineering mechanics

Acceleration Aeroelasticity Air velocity measurement Anelasticity Anemometer. Angular frequency Angular momentum Archimedes' principle. Beattie-Bridgeman equation. Bending moment. *Bernoulli's theorem* Borda mouthpiece. Boundary-layer flow Boyle's law Brittleness. Buoyancy. Cavitation Center *of* gravity Center of mass. Center of pressure. Centrifugal force Centripetal force. Centrode. Centroids of areas and lines Channel, open Charles' law Collision. Compressible flow. Conservation of energy Conservation of momentum Constraint Couple Crane hook. Creep of materials. Crocco's equation Curved bars. D'Alembert's paradox. Dalton's law Degree of freedom (mechanics) Diffuser Dimensional analysis. Dimensions (mechanics) Displacement (mechanics). Doublet flow Ducted flow Dynamic similarity. Dynamics. Efficiency Elastic limit Elasticity. Energy. Equilibrium of forces Euler's momentum theorem. Flight dynamics. Flight science Flow of fluids *Flow* measurement Fluid dynamics. Fluid mechanics Fluid statics *Fluid flow principles* Fluid flow properties. Flutter, aeronautical. *Force* Friction Froude number Gas dynamics. Gas kinematics. Gas kinetics Gas mechanics. *Hardness* scales Harmonic motion High-pressure physics Hooke's law. *Horsepower*. Hydraulic analog table. Hydraulic gradient. Hydraulic jump. Hydraulics. Hydrodynamics. *Hydrokinematics*. Hydrokinetics. Hydromechanics. Hydrostatics. Hypersonic *flight* Impact (impulsive force) Impulse (mechanics). Incompressible flow Inertia. Isentropic flow. Jet flow Karman vortex street Kelvin's circulation theorem. Kelvin's minimum energy theorem. *Kinemat-*

eter. Bonding. Bootstrap circuit. Breadboarding. Breakdown potential. Bridge circuit. Brush discharge. Calibration. Canal rays Capacitance box. Capacitance measurement. Capacitor. Cascode amplifier. Cathode follower. Cathode rays. Cathode-ray tube. Cavity resonator. Characteristic curve. Choke (filter). Chopping. Circuit, electronic. *Clamping circuit. Clipping circuit. Closed-circuit* television. Coaxial cable. Coil. Coincidence amplifier. Cold-cathode tube. Color television. Communications, electrical Comparator circuit. Compass, radio. *Conductance. Conduction band Contact* potential difference. Contact rectifier. Continuous-wave radar. Controlled rectifier. Corner reflector antenna. Corona discharge. Counting circuit. Course-line computer. Crossover network. Crosstalk. Cryosar. Cryotron. Current balance Current measurement. Cyclotron resonance experiments. Dark current. Data transmission. Decca Dectra. Delay line. Demodulator. Detector. Digital voltmeter. *Diode*, vacuum. *Direct-coupled amplifier*. Directional coupler. Direction-finding equipment Discriminator. Disk recording. Distortion (electronic circuits). Donor atom. Doppler radar. Echo box. Electric energy measurement. Electric power measurement Electrical conduction in gases Electrical measurements Electrical standards Electroacoustics. Electrodynamic instruments. Electrometer. Electron. Electron emission Electron lens. Electron motion in vacuum. *Electron optics* Electron tube Electronic countermeasures. Electronic writing. Electronics. Electrostatic lens Equalization, frequency-response. Equivalent circuit. *Esaki tunnel diode. Excitation.* Excitation potential Excitron. Fascimile. Feedback circuit. Ferrite devices Fidelity Field emission. Field-enhanced emission. Filter, electric. Fluorescent lamp. Frequency counter. Frequency divider. Frequency measurement. Frequency modulator. Frequency multiplier. Frequency-modulation detector. Frequency-modulation radio. Gain. Galvanometer. Gas tube. Gate circuit. Geiger-Müller counter. *Germanium diode. Glow discharge. Ground-con*trolled-approach system (GCA) Grounding, electronic equipment. Ground-position indicator (GPI). Gyrator. Hall effect Harmonic analyzer. Hearing aid. Heptode. Heterodyne principle Hexode. High fidelity. Hyperbolic navigation system Ignitron Image orthicon. Impedance, electrical. Impedance matching. Impedance measurements, high-frequency. Inductance measurement. Inductometer. Inductor. *Inertial guidance system In*frared detector. Infrared image converter tube. Instability, electrical. Instrument landing system (ILS). Instrumentation. Intercommunicating system. Interference, electrical. Intermediate-frequency amplifier. Inverter. Ionization. Ionization chamber. Ionization potential. Jamming. Junction diode. Junction transistor. Kelvin bridge. Kinescope. Klystron. Langmuir-Child law. Lighthouse tube. *Limiter circuit. Linearity. Lissajous figures.* Load line. Loading, electrical Loran. Magnetic lens. Magnetic recording. Magnetron. Maser. Meissner effect. Mercury-vapor lamp. Mercury-vapor rectifier. Microcircuitry. Microphonic tube Microscope, electron. Microwave. Microwave optics. Microwave transmission lines. Microwave tube. Miniaturization of equipment. Mixer. Modulator. Molecular electronics. Monopulse radar. Motorboating. Moving-target indication. Multimeter. Multiplexing. Multivibrator. Navarho. Navigation systems, electronic. Neon glow lamp. Noise, *electrical. Noise filter, radio Noise generator,* electrical. Number indicator tube. Octode. Ohmmeter. Omega. Oscillator. Oscillograph. Oscilloscope, cathode-ray. Packaging of equipment. Parametric amplifier. Parasitic oscillation. Particle detector. Passive radar. Pentagrid converter. Pentode, vacuum Phase inverter Phase meter. Phase modulator Phase-angle measurement. Phase-modulation detector Photoconductive cell. Photoconductivity. *Photodiode Photoelectric devices Photoelectric*ity. Photoemission Phototransistor. Phototube. Phototube, multiplier. Photovoltaic cell. Photovoltaic effect. Piezoelectric crystal. Piezoelectricity. Point-contact diode Point-contact transistor. Polar-coordinate navigation systems. Potentiometer (variable resistor) Potentiometer (voltage measurement) Power amplifier. Power supply, electronic. Power-factor meter. Preamplifier. Precision approach radar (PAR). Pressure transducer. Printed circuit. Privacy systems (scrambling). Pulse generator Pulse modulator. Push-pull amplifier Q meter Quadrature. Quartz clock. Radar. Radio *Radio astronomy. Radio broadcasting.* Radio broadcasting networks. Radio range. Radio receivers Radio spectrum allocations. Radio telescope Radio transmitter. Radioactivity (applications) Radio-frequency amplifier. Radio-wave propagation. Radome Recording Recording instruments, graphic Rectifier Reflectometer, microwave Regeneration (engineering) Regulation. Relaxation oscillator. Relay. Reliability of equip*ment. Resistance measurement. Resistor.* Resonance (alternating-current circuits). Response. Ripple voltage Saint Elmo's fire. Saturation. Saturation current Saw-tooth wave. Scaling circuit. Schematic drawing Schottky effect. Scintillation counter Secondary emission. Selectivity. Semiconductor. Semiconductor rectifier. Sensitivity Shielding, electrical Shunting Signal generator. Signal tracer. Signal-to-noise ratio Silicon diode. Sodium-*vapor lamp Solar battery. Sonar* Sound recording Sound reproduction systems, electrical Space charge. Spark, electric. Spark gap. Spectrum analyzer. Sputtering. Square wave. Stabilization Standing-wave detector. Static. Storage devices Storage tube. *Striation. Superconductivity. Super*heterodyne receiver. Suppression. Suppressor. Surface-barrier transistor. *Surging Surveillance radar.* Sweep generator. Switch, electronic. Switching circuit. Switching theory. Switching tubes. Synchro-

Sugar Tea Thickening Unit operations. Unit processes. Vanilla extract. Wheat.

For many aspects of food production *see* AGRICULTURE

Forestry

Arborvitae Ash Balsa Basswood. Beech. Birch Buckeye. Cedar. Cherry. Cherry, wild black. Chestnut. Cypress Dendrology. Dogwood. Douglas-fir Ebony Elm. Fir Forest and forestry. Forest conservation Forest ecology. Forest fire control Forest mapping Forest mensuration Forest seeding and planting Forest soil. Forest tree nursery management. Forestry, farm. Hackberry. Hemlock. Hickory Holly. Hophornbeam. Hornbeam. Ironwood Kentucky coffeetree Larch. Lignumvitae. Locust (forestry). Logging (forestry). Lumber manufacture. Magnolia. Mahogany. Maple. Mulberry Oak Osage-orange Pine Plywood. Poplar. Red alder. Redwood Sassafras Sequoia. Silviculture. Sourwood Spruce. Sweetgum. Sycamore. Tree. Tulip tree Tupelo Veneer. Walnut. Willow Wood (anatomy and identification) Wood fiber products Wood finishing Wood physics Wood preservation Woodworking Yew.

For economic aspects *see* CONSERVATION; for structure, environmental and classificatory aspects *see* PLANT ANATOMY; PLANT ECOLOGY; PLANT TAXONOMY.

General physiology

Bioelectric model. Biological effects of sound waves. Biopotentials and electrophysiology Cell (biological) Cell (pressure-temperature effects) Cell membranes and monolayers. Cell-surface ionization Cytochemistry Cytology (molecular basis). Electrophysiology (heart) Infrared radiation (biology) Mechanoreceptors. Molecular biophysics. Neurophysiology. Nuclear radiation (biology). Radiation biochemistry Radiation cytology Radiation microbiology

For many chemical and physical aspects of physiology see BIOCHEMISTRY, BIOPHYSICS; for those aspects pertaining to cell function *see* CYTOLOGY; for those aspects pertaining to plants *see* PLANT PHYSIOLOGY

See also COMPARATIVE PHYSIOLOGY.

Genetics

Allele Bacterial genetics Biometrics. Breeding (animal) Breeding (plant). Cell division. Chromosome Chromosome aberration. Chromosome theory of heredity. Cytokinesis. Cytoplasmic inheritance. Deoxyribonucleic acid. Dominance, recessiveness, blending Eugenics Experiment Expressivity, gene Gene Gene action Genetics Hardy-Weinberg formula. Heterosis Human genetics. Lethal gene Linkage, genetic. Maternal influence Meiosis Mendelism Mitosis Mutation Penetrance, gene Phenocopies Pleiotropism Polyploidy. Pseudoalleles Recombination, genetic Ribonucleic acid Sex determination Sex influenced inheritance Sex linked inheritance. Syngamy.

For information on the chemistry of the physiological processes *see* BIOCHEMISTRY; for information on the origin of life, animal evolution and plant evolution *see* EVOLUTION; for those aspects of genetics which apply to microorganism *see* MICROBIOLOGY.

Geochemistry

Atmosphere, geochemistry of Atmospheric chemistry Biosphere [illegible] Cosmo- [illegible] dun- [illegible] Elements and nuclides (origin) Fused salt phase equilibria Geochemical prospecting Geochemistry. Geochronometry Geologic thermometry Geological time scale High pressure phenomena Hydrosphere Hydrosphere, geochemistry of Isotope dilution techniques. Lead isotopes, geochemistry of Life, origin of Lithosphere. Lithosphere, geochemistry of Low level counting Marine sediments. Meteorite Ocean currents Ore deposits, geochemistry of Paleobiochemistry Paleoecology (geochemical aspects) Petroleum (origin) Radioactive fallout. Radioactive minerals Radioactive species produced by cosmic rays Radioactive waste disposal Radiocarbon dating Rock (age determination) Silicate phase equilibria Sulfide phase equilibria Tektite Terrestrial nuclear reactions. Tracer, radioactive

For techniques and methods related to Geochemistry *see* ANALYTICAL CHEMISTRY, ATOMIC PHYSICS, ELECTROMAGNETIC RADIATION, MOLECULAR PHYSICS, NUCLEAR ENGINEERING, NUCLEAR PHYSICS, PHYSICAL CHEMISTRY

Geography

See PHYSICAL GEOGRAPHY

Geology (mineralogy and petrology)

Agate Albite Allanite Alunite Amber Amblygonite Amethyst Amphibole Amphibolite Analcime. Andalusite Andesine Andesite Anglesite Anhydrite Ankerite Anorthite Anorthoclase Anorthosite Anthophyllite Apatite Aphanite Aplite Apophyllite Aragonite Arenaceous rocks Argentite Argillaceous rocks Argillite Argyrodite Arkose Arsenolite Arsenopyrite Asbestos Augite Aureole, contact Azurite Baddeleyite Barite. Basalt Bauxite Bentonite Beryl. Beryllonite. Biotite Boracite Borate minerals Bornite Bournonite. Breccia Brochantite Brucite Bytownite Calcarenite. Calcite Caliche Cameo Cancrinite Carat Carbonate minerals Carnotite. Cassiterite. Celestite Cerargyrite Cerussite Chabazite. Chalcanthite Chalcedony Chalcocite Chalcopyrite Chalk. Chert. Chlorite Chloritoid Chromite Chrysoberyl Chrysocolla Cinnabar. Clay Clay, commercial Clay minerals Coal. Cobaltite Columbite. Concretion Conglomerate Coquina Cordierite Corundum

ics. Kinetics (classical mechanics). Knudsen number. Laminar flow. Laplace's irrotational motion. Loading, transverse. Loads, dynamic. Loads, repeated. Mach number. Mechanical advantage. Mechanics. Mechanics, classical. Metal, mechanical properties of. Mode of vibration. Model theory. Moment of inertia. Momentum. Motion Motion, rectilinear. Navier-Stokes equations. Newton's laws of motion. Newtonian fluid. Nozzle. Nutation (astronomy and mechanics). Orifice. Oscillation. Pascal's law. Pendulum. Periodic motion. Pipe flow. Pitot tube. Plastic deformation of metal Plasticity. Plate, structural. Pressure vessel. Power. Prandtl-Meyer expansion fan Precession. Pressure Product of inertia Radius of gyration. Relative motion. Resilience. Resonance (acoustics and mechanics). Resultant of forces. Reynolds number. Rheology. Rigid-body dynamics. Ring. Ripple tank. Riveted joint. Rotational motion Rudder, aircraft Safety factor. Schlieren photography. Shadowgraph of fluid flow. Shear. Shear center. Shock isolation. Shock wave. Shock-wave display Similitude. Sink flow. Skin friction Sonic barrier. Sonic boom. Source flow Statics Statics in space. Stokes stream function. Strain. Strain gage. Strain rosette. Streamline flow. Streamlining. Strength of materials. Stress and strain Stress concentration. Superaerodynamics. Supersonic diffuser. Supersonic flight. Sympathetic vibration Thermal stress Throttled flow. Torque. Torricelli's theorem Torsion. Towing tank. Turbulent flow Velocity Venturi tube. Vibration. Vibration damping. Vibration isolation Vibration machine. Vibration pickup Viscous flow. Vortex Wake flow Water hammer. Water tunnel. Wave motion in fluids Wave motion in liquids. Wind tunnel. Wind-tunnel instrumentation Wood physics. Work. Young's modulus.

Evolution

Animal evolution Cambrian Carboniferous Cenozoic Cretaceous Devonian. Eocene Evolution, organic Jurassic. Life, origin of Macroevolution Mesozoic Miocene. Mississippian. Mutation (ontogeny). Oligocene. Ordovician. Paleocene. Paleozoic. Pennsylvanian. Permian Plant evolution. Pleistocene. Pliocene Population genetics Quaternary. Recent. Silurian Speciation. Tertiary. Triassic.

For specific groups of invertebrate animals *see* INVERTEBRATE ZOOLOGY; for further aspects of plant evolution *see* PALEOBOTANY, for further aspects of animal evolution *see* PALEONTOLOGY, for specific groups of animals *see* VERTEBRATE ZOOLOGY. *See also* ANTHROPOLOGY.

Flight science

For aircraft design *see* AERONAUTICAL ENGINEERING. For theoretical aspects of air flow phenomena *see* FLUID MECHANICS. *See also* THERMODYNAMICS.

Fluid mechanics

Adiabatic process. Aerodynamic center. Aerodynamic force. Aerodynamic wave drag. Aerodynamics. Aeromechanics. Aeronautical engineering. Aerostatics. Aerothermodynamics Air pocket. Airfoil. Airfoil profile. Air-velocity measurement. Anemometer. Archimedes' principle. Aspect ratio. Beattie-Bridgeman equation. Bernoulli's theorem. Borda mouthpiece. Boundary-layer flow. Boyle's law. Buoyancy. Cavitation. Channel, open. Charles' law. Chemical engineering. Compressible flow. Conservation of energy. Crocco's equation. D'Alembert's paradox. Dalton's law. Diffuser. Doublet flow Ducted flow. Dynamic similarity. Electrolytic tank. Elevator, aircraft. Euler's momentum theorem. Flight. Flight dynamics. Flow of fluids Flow measurement. Fluid dynamics. Fluid mechanics. Fluid statics. Fluid-flow principles. Fluid-flow properties. Flutter, aeronautical. Froude number. Gas dynamics Gas kinematics. Gas kinetics. Gas mechanics High-pressure physics Hydraulic analog table. Hydraulic gradient Hydraulic jump. Hydraulics Hydrodynamics Hydrokinematics Hydrokinetics Hydromechanics Hydrostatics. Incompressible flow. Isentropic flow. Jet flow. Karman vortex street. Kelvin's circulation theorem. Kelvin's minimum energy theorem Knudsen number. Laminar flow. Laplace's irrotational motion Mach number Model theory. Navier-Stokes equation. Newtonian fluid Nozzle Orifice Pascal's law. Pipe flow Pitot tube Potentials (physics). Prandtl-Meyer expansion fan. Pressure. Pressure measurement. Propeller, air Reynolds number. Rheology. Ripple tank. Rudder, aircraft. Schlieren photography Shadowgraph of fluid flow Shock wave. Shock-wave display. Similitude. Sink flow. Skin friction Sonic barrier Sonic boom Source flow. Stabilizer. Stokes stream function Streamline flow. Streamlining Subsonic flight Superaerodynamics. Supersonic flight. Supersonic diffuser. Throttled flow Torricelli's theorem Towing tank. Turbulent flow Venturi tube. Viscous flow Vortex Wake flow. Water hammer. Water tunnel. Wave motion in fluids Wave motion in liquids Wind tunnel. Wind-tunnel instrumentation Wing Work.

Food engineering

Baking powder Barley. Buckwheat Butter. Casein Charcoal Cheese Citrus flavoring Cocoa powder and chocolate. Coffee. Corn. Egg processing. Fat and oil, edible. Filtration Food. Food engineering Food manufacturing. Food microbiology. Food poisoning, bacterial. Food preservation. Food science Food spoilage Food technology Gelatin. Gum. Heat exchanger. Ice cream. Margarine. Milk Mixing Monosodium glutamate Oats Peanut. Pepsin Radioactivity (applications). Rennin. Rice. Rye. Salt (food). Sedimentation (industrial). Size reduction. Soybean. Spice and flavoring. Starch

GEOGRAPHY; For the development of plants, animals, and man, the lines of descent, and the history of such relationships see ANTHROPOLOGY; EVOLUTION; PALEOBOTANY, PALEONTOLOGY. For an interpretative description of relief features, resources, and the graphic representation of earth features *see* PHYSICAL GEOGRAPHY.

Geophysics

Aeromagnetic surveying Aeronomy Air glow. Albedo Aphelion Apogee. Aquifer. Artesian systems. Atmospheric electricity Atmospheric evaporation. Aurora. Cloud physics. Compass, magnetic. Cosmic rays. Declinometer Earth Earth (heat flow). Earth (orbital motion). Earth deformations and vibrations Earth inductor. Earth interior. Earth sciences. Earth tides. Earthquake. Electrojet, upper air Evapotranspiration Geodesy. Geologic thermometry Geomagnetic storm. Geomagnetic variations, transient. Geomagnetism Geophysical exploration. Geophysics. Geyser. Glacier Ground water High-pressure phenomena. Hydrography. Hydrolaccolith. Hydrology. Ice field (Eisstromnetz) Inclinometer. Ionosphere. Isostasy Lightning Magnetometer Meteorological instrumentation Meteorological rockets Meteorological use of satellites Mineral spring. Moho (Mohorovičić discontinuity). Mohole Orogeny Perigee Polar wandering Polygonal ground Prospecting. Prospecting, petroleum Rock magnetism. Seismograph Seismology. Snow field Snow gage. Snow line Snow surveying Solifluction Spring (water). Stream gaging Surface water. Swamp, marsh and bog Tectonophysics. Terrestrial electricity. Terrestrial force fields Terrestrial frozen water. Terrestrial gravitation. Terrestrial magnetism. Thermal spring Tide. Tsunami Van Allen radiation. Variometer. Volcanology. Warping, earth crust. Water table. Well

For cosmic-terrestrial relationships and related geophysical and cosmological phenomena *see* ASTRONOMY; GEOCHEMISTRY, SPACE TECHNOLOGY For a treatment of absolute geochronology and of geochemical processes in the atmosphere, biosphere, hydrosphere, and lithosphere *see* GEOCHEMISTRY. For additional information on related geophysical phenomena of the atmosphere and oceans *see* METEOROLOGY AND CLIMATOLOGY; OCEANOGRAPHY

Graphics and graphic arts

Book manufacturing Composition (type). Descriptive geometry. Dimensioning Drafting Drafting machine Engineering drawing Engineering graphics Ink Layout drawing Paper and paper products Photocopying processes Pictorial drawing Printing Prin[illegible]
press. Sche[illegible]
typewriter.[illegible]

Growth and morphogenesis

Adrenal gland Allantois. Amnion. Androgenesis. Animal. Animal morphogenesis Aortic body. Blastulation. Cardiovascular system. Carotid body. Cell constancy. Cell lineage. Chorion. Cleavage, embryonic. Coelom Digestive gland Digestive system. Ear Embryogenesis. Embryology. Embryology, experimental. Embryonic differentiation Embryonic induction Embryonic organizer. Endocrine gland. Endocrine system Epidermal ridges. Esophagus. Estrus. Extraembryonic membranes. Eye Fate maps, embryonic. Feather (bird). Fertilization. Fetal membrane Fingerprint Gallbladder Gametogenesis. Gastrulation. Germ layers. Gland Gynogenesis Hair. Hematopoiesis Histogenesis. Integument Integumentary patterns. Invertebrate embryology. Kidney. Lacrimal gland. Lip Liver. Lymphatic system. Mammary gland. Merogony. Metamerism, embryonic. Muscular system. Nervous system. Neural crest. Neurulation. Oogenesis. Oral gland. Ovum. Palate. Pancreas Parathyroid gland. Pharynx. Photophore gland Placentation. Plant morphogenesis Poison gland Primitive gut. Protogyny Reproduction, animal Reproductive system Respiratory system. Salt gland. Scale (zoology) Scent gland. Sebaceous gland. Sexual dimorphism Skeletal system. Sperm cell. Spermatogenesis. Sweat gland. Swim bladder Teratogenesis Thymus gland Thyroid gland Tongue Tooth Ultimobranchial bodies Urinary system Uropygial gland Yolk sac.

For various animal groups in which certain embryological aspects may be discussed *see* INVERTEBRATE ZOOLOGY; VERTEBRATE ZOOLOGY.

Heat

Absorption (electromagnetic radiation). Black body Bolometer Boltzmann constant. Boltzmann statistics. British thermal unit (Btu) Brownian movement Calorie Calorimetry Chemical fuel. Color temperature. Combustion. Conduction (heat) Conservation of energy. Convection (heat). Dewar flask. Eigenfunction Emissivity Energy Energy sources Enthalpy Fire Flame. Fossil fuel. Fuel. Fuel gas Fuel gas supplements. Gray body. Heat. Heat balance Heat capacity Heat exchanger. Heat radiation. Heat transfer Ice point. Incandescence [illegible]
matter [illegible]
ics Ox[illegible]
law Pc[illegible]
Specific heat of solids. Statistical mechanics Temperature Temperature measurement. Thermal expansion Thermal stress Thermoanalysis Thermocouple Thermodynamic principles. Thermodynamic processes. Thermometer Turbine propulsion. Work.

See also THERMODYNAMICS

Covellite. Crocoite. Cryolite. Crystal growth. Crystal optics. Crystal structure. Crystallography. Cummingtonite. Cuprite. Dacite. Datolite. Diabase. Diamond. Diatomaceous earth. Diopside. Diorite. Dolomite. Dolomite rock. Dumortierite. Eclogite. Emerald. Emery. Enargite. Enstatite. Epidiorite. Epidosite. Epidote. Epsomite. Feldspar. Feldspathoid. Felsite. Ferberite. Flaser rock. Fluorite. Franklinite. Fuller's earth. Gabbro. Galena. Garnet Garnierite. Gem. Gem, manufactured Gem cutting. Gem mounting. Gemology. Geode. Glauconite Glaucophane. Gneiss. Goethite. Granite. Granitization. Granodiorite. Granulite. Gravel. Graywacke. Greenockite. Greisen. Gypsum. Halloysite. Halogen minerals. Hausmannite. Hematite. Hemimorphite. Heulandite. Hornblende. Hornfels. Huebnerite. Humite. Huntite. Idocrase. Igneous rocks. Illite. Ilmenite. Intaglio (gemology). Jade. Jadeite Jasper. Jet (gemology). Kaliophilite Kalsilite. Kaolinite. Kutnahorite. Kyanite Labradorite. Lamprophyre Larnite. Laterite. Latite. Lava. Lazurite. Lepidolite Leucite. Leucite rock. Lignite Limburgite. Limestone. Limonite Magma. Magnesite. Magnetite. Malachite Manganite. Marble. Marcasite. Marl. Melanterite. Melilite. Merwinite. Metamorphic rocks. Metamorphism. Metasomatism. Mica. Mica schist. Microcline. Migmatite Millerite. Mineral. Mineral fuel areas Mineral resource areas. Mineral resources conservation. Mineralogy. Molybdenite. Monazite. Montmorillonite. Monzonite. Moraine. Muscovite. Mylonite. Native elements. Natrolite. Nepheline syenite. Nephelinite. Niccolite. Niter. Nitrate minerals. Obsidian. Oligoclase. Olivine. Onyx Oolite and psiolite. Opal. Ore and mineral deposits. Orpiment. Orthoclase. Orthoquartzite Orthorhombic pyroxene. Pearl. Peat Pectolite. Pegmatite. Pentlandite. Peridotite. Perlite Perovskite. Perthite. Petrographic province. Petrography. Petrology. Phenocryst. Phlogopite. Phonolite. Phyllite Phyllonite. Picrite. Pigeonite. Pitchstone. Pneumatolysis. Pollucite Porphyroblast Porphyry. Precious stones. Prehnite. Proustite. Psilomelane Pumice. Pyrargyrite. Pyrite. Pyroclastic rocks. Pyrolusite. Pyromorphite Pyroxene. Pyroxenite Pyrrhotite. Quartz. Quartzite. Radioactive minerals Radiolarian earth. Rapakivi granites. Realgar. Rhodochrosite Rhodonite. Rhyolite. Rock. Rock salt. Rubellite. Ruby. Rutile. Sandstone Sanidinite Sapphire. Scapolite. Scheelite. Schist Sedimentary rocks Sepiolite. Serpentine. Serpentinite Shale Siderite. Silicate minerals. Siliceous sinter Sillimanite. Skarn. Skutterudite. Slate. Smithsonite. [illegible]

[illegible]

bite. Stone and stone products. Strontianite. Stylolites Subgraywacke. Syenite. Taconite Talc Tantalite. Tetrahedrite. Theralite. Thorianite Thorite Tonalite. Topaz. Tourmaline. Trachyte. Travertine. Tremolite. Tufa. Tuff. Turquois. Uraninite. Vermiculite. Vivianite. Volcanic glass. Wavellite. Willemite. Witherite. Wolframite. Wollastonite. Wulfenite. Wurtzite X-ray powder method. Zenolith. Zeolite. Zincite. Zircon.

For additional treatment of ore and mineral deposits and geochemical processes *see* GEOCHEMISTRY. For additional treatment of crystalline materials *see* SOLID-STATE PHYSICS. For engineering aspects *see* ENGINEERING GEOLOGY. For surficial and historic aspects *see* GEOLOGY (SURFICIAL AND HISTORICAL).

Geology (surficial and historical)

Albertite. Amygdule. Anticline. Archeozoic. Asphalt and asphaltite. Atoll. Authigenic minerals. Avalanche. Barrier reef. Basement rock. Batholith Bioherm. Biostrome. Bitumen. Black shale. Cambrian. Carboniferous. Cave. Cenozoic. Cirque. Cleavage, rock. Coastal landforms. Coastal plain Continental shelf and slope. Coral reef. Cretaceous. Cyclothem. Dating methods Delta Desert erosion features. Devonian. Diagenesis. Diapiric structures. Diastem. Diastrophism. Dopplerite Drumlin Dune Earthquake. Elaterite. Engineering geology. Eocene. Erosion. Escarpment. Esker. Evaporite (saline). Exfoliation, rock. Facies (geology). Fall line Fault and fault structures. Finger lakes. Fiord. Flood plains Fluvial erosion cycle. Fluvial erosion landforms. Fold and fold systems. Fringing reef. Frost action. Geology. Geomorphology. Geosyncline. Gilsonite. Glacial Epoch. Glaciated terrane. Graben Hatchettite. Horst. Impsonite. Jurassic. Kame. Karst topography. Kerogen Laccolith Landslide. Loess Marine sediments Mass wasting. Massif. Matterhorn. Mesozoic Miocene. Mississippian. Mud volcano Natural gas. Oceanic islands Oil sand Oil shale. Oil-field waters. Oligocene Ordovician Ozokerite Paleocene. Paleoclimatology. Paleoecology. Paleogeography. Paleogeology. Paleozoic Pennsylvanian Permian Petrofabric analysis Petroleum. Petroleum geology. Playa Pleistocene Pliocene. Pluton Precambrian Proterozoic. Quaternary. Recent Redbed Regolith Rift valley Rock mechanics. Salt dome Sand. Sapropel. Schistosity, rock Seamount and guyot Sedimentation (geology). Shore processes. Silurian Strand line. Stratigraphic nomenclature Stratigraphy Stream transport and deposition. Stromatolite. Structural geology Structural petrology Submarine canyon. Submarine topography Syncline. Talus. Tectonic patterns Tertiary. Till Torbanite. Triassic Ulmin Unconformity Varve Volcano. Weathering processes. Wurtzilite

For the origin, distribution, and abundance of the earth's elements, their geochemical cycles, and absolute methods of geochronology *see* GEOCHEMISTRY For properties of minerals and the petrography and petrogenesis of rocks, mineral and ore deposits, see GEOLOGY (MINERALOGY AND PETROLOGY). For geophysical phenomena of the earth, its waters, and its atmosphere *see* GEOPHYSICS; METEOROLOGY AND CLIMATOLOGY; *OCEA-*

NOGRAPHY; For the development of plants, animals, and man, the lines of descent, and the history of such relationships see ANTHROPOLOGY; EVOLUTION; PALEOBOTANY; PALEONTOLOGY. For an interpretative description of relief features, resources, and the graphic representation of earth features see PHYSICAL GEOGRAPHY.

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Aeromagnetic surveying Aeronomy. Air glow Albedo Aphelion Apogee. Aquifer, Artesian systems Atmospheric electricity. Atmospheric evaporation Aurora. Cloud physics. Compass, magnetic. Cosmic rays. Declinometer Earth Earth (heat flow) Earth (orbital motion). Earth deformations and vibrations. Earth inductor. Earth interior. Earth sciences Earth tides Earthquake Electrojet. upper air. Evapotranspiration Geodesy. Geologic thermometry Geomagnetic storm Geomagnetic variations, transient Geomagnetism Geophysical exploration Geophysics Geyser. Glacier. Ground water High-pressure phenomena Hydrography. Hydrolaccolith. Hydrology Ice field (Eisstromnetz) Inclinometer. Ionosphere Isostasy Lightning Magnetometer Meteorological instrumentation. Meteorological rockets. Meteorological use of satellites Mineral spring Moho (Mohorovičić discontinuity). Mohole. Orogeny Perigee Polar wandering. Polygonal ground Prospecting Prospecting, petroleum Rock magnetism Seismograph Seismology. Snow field Snow gage Snow line Snow surveying Solifluction Spring (water) Stream gaging Surface water. Swamp, marsh and bog Tectonophysics Terrestrial electricity Terrestrial force fields Terrestrial frozen water. Terrestrial gravitation Terrestrial magnetism Thermal spring Tide Tsunami Van Allen radiation Variometer. Volcanology Warping, earth crust. Water table Well

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For various animal groups in which certain embryological aspects may be discussed see INVERTEBRATE ZOOLOGY; VERTEBRATE ZOOLOGY

Heat

Absorption (electromagnetic radiation). Black body Bolometer Boltzmann constant Boltzmann statistics. British thermal unit (Btu). Brownian movement Calorie. Calorimetry. Chemical fuel. Color temperature Combustion Conduction (heat) Conservation of energy. Convection (heat). Dewar flask Eigenfunction. Emissivity Energy. Energy sources Enthalpy. Fire Flame. Fossil fuel. Fuel Fuel gas Fuel gas supplements. Gray body. Heat Heat balance. Heat capacity. Heat exchanger. Heat radiation Heat transfer Ice point. Incandescence. Insulation, heat. Joule. Kinetic theory of matter. Lattice vibrations Low-temperature physics. Oxidation process Phonon. Planck's radiation law. Power. Pyrometer Solar energy. Specific heat. Specific heat of solids Statistical mechanics. Temperature. Temperature measurement Thermal expansion. Thermal stress. Thermoanalysis Thermocouple. Thermodynamic principles. Thermodynamic processes Thermometer. Turbine propulsion. Work.

See also THERMODYNAMICS.

Histology

Adipose tissue. Blood. Bone. Cardiovascular system. *Cartilage.* Connective tissue. *Digestive* system Epithelium. Lymphatic system. Muscle. Muscular system. Nerve. Nervous system. Reproductive system. Respiratory system. Skeletal system. Tissue. Urinary system.

For specific animal groups see INVERTEBRATE ZOOLOGY; VERTEBRATE ZOOLOGY.

Hydrology

Agriculture (drainage). Aquifer. Artesian systems Atmospheric evaporation. Basin. Canal. Cave. Channel, open. Cloud physics. Dam. Evapotranspiration. *Flood plains. Fluvial erosion cycle.* Fluvial erosion landforms. Frost action. Geyser. Glacier. Ground water. Hydrography. Hydrolaccolith. Hydrology. Hydrometeorology. Hydrosphere. Hydrosphere, geochemistry of. Ice field (Eisstromnetz). Irrigation of crops. Karst topography Lake Limnology. Meteorological instrumentation. Mineral spring. *Oasis.* Permafrost. *Plant,* water relations of. Playa. Polygonal ground. Precipitation Precipitation gages. Reservoir. River. River engineering. River tides. Sedimentation (geology). Sewage disposal. Snow. Snow field Snow gage Snow line. Snow surveying. Soil. Soil Conservation Soil mechanics. Solifluction. Spring (water). Stream gaging Stream transport and deposition Surface water Swamp, marsh, and bog. Terrestrial frozen water. Thermal spring. Tree-ring hydrology. Water. *Water analysis.* Water conservation. Water microbiology. Water pollution. Water power. Water supply engineering. Water table. Well

See also FLUID MECHANICS; METEROLOGY AND CLIMATOLOGY. OCEANOGRAPHY.

Illumination engineering

See ELECTRICAL ENGINEERING.

Immunology

Ablastin. Agglutination reaction. Agglutinin Allergy, atopic Antibody. Antigen. Antigen-antibody reaction. Antitoxin Arthus reaction Blood groups Complement (serum). Complement-fixation test. Conglutination. Germfree vertebrate Hypersensitivity. Immunity. Immunology. Lysin Lytic reaction. Neutralization reaction (antibody). Neutralizing antibody. Serology. Skin test

Industrial and production engineering

Allowance. Assembly methods. Automation. Bulk-*handling machines.* Caliper. Comparator. Control chart. Conveying machines. Conveyor. Crane hoist. Derrick. Design standards. Dimensioning Drafting machines. Elevating machines. Engineering. Engineering and architectural contracts. Environmental test. Escalator. Force fit. Gages. Gantt chart. Hoisting machines. Industrial control Industrial engi*neering.* Industrial trucks Inspection and testing. Inventory management. Jig, fixture, and die design. Linear *programming. Location fit.* Mass production. Materials handling. Materials handling machines. Methods engineering. Methods study. Micrometer. Miniaturization of equipment. Monorail Nomograph. Operations research. Operator training Optical flat. Packaging of equipment. Patent. Pilot production. Plant facilities. Press fit. Product *design. Production engineering. Production* methods. Production planning. Prototype (equipment). Qualification test. Quality control. Reliability of equipment. Running fit Shrink fit. Technology. Tolerance Wage incentives. Work measurement. Work standardization.

For industrial psychology and human engineering *see* PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL For industrial and production equipment, techniques, and materials, see the various engineering lists such as CIVIL ENGINEERING; CONTROL SYSTEMS; ELECTRICAL ENGINEERING; MECHANICAL ENGINEERING.

Industrial microbiology

Acetobacter suboxydans fermentation. Acetone-butanol fermentation. Acetone-ethanol fermentation *Amphotericin B. Antibiotic. Bacitracin* Bacteria. Bacterial genetics Bacterial metabolism. Bacterial nutrition. Bacterial physiology. Bioassay 2,3-Butanediol Butter. Carbomycin. Cheese Chloramphenicol. Chlortetracycline. Citric acid. Culture, elective Culture, media components of Culture, pure Culture technique. Cycloserine Demethyl-*chlortetracycline Dextran. Distilled* spirits. Enzyme (industrial production). Epoxysuccinic acid. Erythromycin Food preservation Fumaric acid Gallic acid Gram's stain Griseofulvin Industrial microbiology. Itaconic acid Itatartaric acid. Kanamycin Kojic acid. Lactic acid. Lactobacillaceae. Lyophilization. Malt beverage. Microbiological methods *Microbiology.* Mushroom. Neomycin Novobiocin Nystatin Oxytetracycline Penicillin. Polymyxin. Saccharomycetales Sterilization. Streptomycetaceae Streptomycin Subtilin Tetracycline Textile microbiology. Viomycin Wine. Yeast, industrial.

Inorganic chemistry

Acetal. Acetate. Acetylation Acetylide Acid and base Acidolysis Actinide elements Actinium Activated carbon Aircraft fuel Air-entraining portland cement *Alcoholysis Alkali Alkali metals* Alkaline-earth metals. Alum Aluminate Aluminum Amalgam. Americium Amide. Amidine Ammine. Ammonia Ammonium salt Antimonate Antimony Aqua regia. Argon Aromatic. Arsenate Arsenic. Arsenite (chemical) Astatine Atmospheric gases, production of Atomic bomb Azide *Barium Barium titanate Base, chemical. Benzoate* Berkelium. Beryllium Bismuth. Borane. Borate Boride Boron Boron fuel. Bromate. Bromide Bromine. Cadmium Calamine. Calcium. Californium

Calomel Carbide Carbon Carbon dioxide. Carbon-nitrogen cycle. Carbonate. Cement Cement asbestos Cerium. Cesium. Chemical compounds. Chemical structures. Chemical symbols and formulas. Chemical warfare. Chemistry. Chlorate. Chloride Chlorine Chloroform Chloroplatinate. Chromate. Chromium Citrate. Clathrate compounds. Clay. Clay minerals. Coagulation Cobalt. Combining volumes, law of. Complex compounds. Concrete Coordination chemistry. Coordination number Copper. Copper chemistry. Cosmochemistry. Cosmogony. Crystal Crystal growth. Crystal structure Curium Cyanamide. Cyanate Cyanide Cyanogen Definite composition law of. Detergent Deuterium Dichromate Dry ice. Dysprosium. Einsteinium Electrochemical series Electrolyte. Electronegativity Elements (chemical). Equivalent weight Erbium. Ethoxide Europium Fermium. Ferric compound Ferricyanide Ferrite Ferrocyanide Ferrous compound Fire. Fluoborate Fluoride Fluorine Fluorocarbon Fluosilicate Francium Fulminate Gadolinium. Gallium Germanium. Gold Gram-equivalent weight Gram-molecular weight Graphite Ground water Grout Gunite Hafnium Halide Halogen elements. Heavy water Helium Helium, liquid Holmium Hydrate Hydrazine Hydride Hydride, metal Hydrogen Hydrogen bomb Hydrogen fluoride Hydrogen ion Hydroxide Hypochlorite. Indium Inert gases. Inorganic chemistry Intermetallic compounds Iodate Iodide Iodine Iodoform Ion Ion propulsion Iridium. Iron Isomorphism (crystallography) Krypton Lactate. Lanthanide contraction Lanthanum Lead Lead isotopes. Liquefaction of gases Lithium Lutetium. Magnesium. Magnetochemistry Manganese Manganese compound Mendelevium. Mercury (element). Metal carbonyl. Metalloacid elements Metalloid Mixture Molybdate Molybdenum. Mordant. Multiple proportions, law of Neodymium Neon Neptunium Nickel Niobium Nitrate Nitric acid Nitride Nitrite Nitro and nitroso compounds Nitrogen Nitrogen oxides Nobelium Nonelectrolyte Nonmetal Nonstoichiometric compounds Nuclear chemistry Oleate Osmium Oxalate Oxidation-reduction Oxide Oxidizing agent Oxygen Ozone Palladium Palmitate Parachor Paraffin Perchlorate Periodate Periodic table Permanganate Peroxide. Persulfate pH Phenacetin Phosphate Phosphorus Picrate Platinum Plutonium Polonium Portland cement Potassium Praseodymium Promethium Protactinium Radiochemistry Radioisotope production Radium Radon Rare-earth elements Raw water Resin Rhenium Rhodium. Rubidium Ruthenium Salicylate Salt (chemical) Samarium Scandium Sea water Selenium Silicate Silicon Silver. Sodium Solid state chemistry Solvent Spinel (chemical) Stearate Stellar evolution Strontium. Structural materials Structural steel. Sulfamate. Sulfate Sulfide Sulfite. Sulfur Sulfuric acid Tantalum Tartrate Technetium Tellurium Terbium Thallium Thiocyanate. Thiosulfate. Thorium. Thulium. Tin Titanate. Transition elements Transmutation Transuranium elements Trifluoroacetate. Tritium Tungstate. Tungsten. Uranium Vanadate Vanadium Water. Xenon. Ytterbium. Yttrium Zinc. Zincate. Zirconium

For the application of inorganic materials of construction *see* CIVIL ENGINEERING. For the earth sciences aspects of ores and minerals from which metals are won *see* GEOLOGY (MINERALOGY AND PETROLOGY). For the practical applications of metals and other inorganics *see* MECHANICAL ENGINEERING. For the field of carbon silicon chemistry and organic metallic compounds *see* ORGANIC CHEMISTRY. For the measurement and determination of inorganic chemical constants *see* PHYSICAL CHEMISTRY.

Invertebrate zoology

Abalone Acanthocephala Acarina Acnidosporidea Acoela. Acoelomata Acrania. Acrothoracica Actiniaria Actinomyxidia Actinopodea. Adeleida. Alcyonacea Alcyonaria. Alloeocoela. Ambergris. Amlypygi Amelia. Amera. Ammonoidea Amoebida. Amphidiscophora. Amphidiscosa Amphilinidea Amphineura Amphipoda. Anaspidacea Animal Animal symmetry Anisomyaria Annelida Anopla. Anoplura Anostraca Ant Ant lion Anthozoa. Anthuridea Antimere Antipatharia Aphelenchoidea. Aphid Aplacophora. Apoda (Crustacea) Apoda (Echinodermata) Aporidea Apostomatida Apterygota Arachnida Araneae Arbacioida. Archiacanthocephala. Archiannelida Arguloida. Arhynchobdellae Army worm Arthropoda Articulata (Brachiopoda) Articulata (Echinodermata) Ascaridida Ascaridina Ascaridoidea Ascaris Aschelminthes Ascidiacea Ascothoracica Asellota. Aspidobranchia Aspidochirota. Aspidogastrea Asteroidea Asterozoa Astomatida Athecanephria. Atremata Aulodonta. Autotomy Axon-olaimoidea [illegible]

[illegible]

Cestida Cestoda Cestodaria Cestoidea Chaetog-natha [illegible]

[illegible]

pedia. Cladocera Cladocopa Clam [illegible]

Corallimorpharia. Coronatae. Crab. Crayfish. Cricket. Crinoid. Crinoidea. Crustacea. Cryptomonadida. Cryptostomata. Ctenophora. Ctenostomata Cubomedusae. Cumacea. Cutworm Cyclophyllidea. *Cyclopoida Cyclostomata (Bryozoa).* Cydippidea. Cysticercosis. Cystidea. Decapoda (Crustacea). Decapoda (Mollusca). Demospongiae. Dendroceratida. Dendrochirota. Dermaptera. *Desmodoroidea. Desmoscolecoidea. Deuterostomia.* Diadematacea. Diadematoida. Dibranchia. Dictyoceratida. Dicyemida. Digenea. Dinoflagellida. Dioctophymoidea Diphyllidea. Diplopoda. *Diploporita. Diplura. Diptera. Dorylaimoidea. Dracunculoidea.* Dragonfly. Earthworm. Earwig. Echinacea. Echinococcosis. Echinocystitoida. Echinodermata. Echinoida. Echinoidea. Echinothurioida. Echiuroidea. Edrioasteroidea. Eimeriida. Elasipoda. Eleutherozoa. Embioptera. Endopterygota. Enopla. Enoploidea. Enterocoela. Enteropneusta. Enterozoa. Entodiniomorphida. Entomology. Entomology, economic. Entoprocta. Eocanthocephala. Eocrinoidea. Ephemeroptera. Epicaridea. Eucarida. Eucestoda. Eucoelomata. Euechinoidea. Euglena. Euglenida. Eugregarinida. Eulamellibranchia. Eumalacostraca. Eumetazoa. Euphausiacea. Euryalae. Eutardigrada. Exopterygota. Filarioidea. Firefly Flabellifera. Flea. Flexibilia. Fly. Foraminiferida. Forcipulata. Gammaridea. Gastropoda. Gastrotricha. Gnathiidea. Gordioidea. Gorgonacea. Grasshopper. Gregarinidia. Gymnolaemata Gymnostomatida. Gyrocotylidea. Haemosporidiida. Hairworm Halichondrida. Haplosclerida. Haplosporidia. Harpacticoida. Helicosporidia. Heliozoida. Hellgrammite. Hemichordata Hemicidaroida Hemidiscosa. Hemimetabola. Hemiptera. Hemizonida. Heterochlorida. Heteronemertini Heterotardigrada. Heterotrichida Hexactinellida Hexactinosa. Hexapoda. Hexasterophora Hirudinea. Holasteroida Holectypoida. Holometabola Holothuroidea. Holotricha. Homoptera. Homosclerophorida. Hookworm. Hoplocarida. Hoplonemertini. Hornet. Hydra. Hydroida Hydrozoa. Hymenoptera. Hymenostomatida Hyperiidea. Hypermastigida Hypotrichida. Ichneumon Inadunata Inarticulata. Insect control, biological. Insecta. Invertebrata. Invertebrate embryology. Irregularia. Isopoda. Isoptera. Ixodides Jellyfish. Katydid. Kinorhyncha Kissing bug. Lancelet. Larvacea. Leaf hopper. *Lecanicephaloidea.* Leech. *Lepadomorpha. Lepidocentroida.* Lepidoptera. Leptostraca. Lernaeopodoida. Leucettida. Leucosoleniida. Limpet Lipostraca. Lobata. Lobster Lophophore Louse Lychniscosa. Lyssacinosa. *Macrodasyoidea* Malacostraca. Mallophaga. Mandibulata. Mantis. Mastigophora. Mayfly. Mealybug Mecoptera Mermithoidea. Mesostigmata. Mesozoa. Metagenesis. Metamerism. Metazoa. *Microsporidia. Microtechnique.* Midge. Milleporina. Millipede. Mite. Mollusca. Molpadonia. Monhysteroidea. Monogenea Monogononta. Monstrilloida. Moruloidea Mosquito. Moth. Mussel. *Mycetozoida. Myiasis. Myodocopa.* Myriapoda. Mysidacea. Mystacocarida. *Myxosporidia* Nautiloidea. Nautilus. Nebaliacea. Nectonematoidea. Nematoda. Nematomorpha. Neogastropoda. Neoteny. Neotremata. Neuroptera. Nippotaeniidea. Notodelphyoida. Notomyota. Notostraca. *Nucleolitoida.* Nuda. Nudibranch Nudibranchia. Obelia. Octopoda. Octopus. Odonata. Odontostomatida. Oegophiurida. Oligochaeta. Oligomera. Oligotrichida. Oniscoidea. Onychopalpida Onychophora. Ophiocystioidea. Ophiurae. Ophiurida. Ophiuroidea. Opisthobranchia. Orthonectida. Orthoptera. Ostracoda. Oxyurina. Oxyuroidea. Oyster. Oyster drill. Paedogenesis. Palaeacanthocephala. Palaechinoida. Palaeoisopus. Palaeonemertini. Palaeotremata. Paleocopa. Palpigradi. Pancarida. Paracrinoidea. Paramecium. Parasitic castration. Parasitology. Parazoa. Parthenogenesis. Pauropoda Paxillosa. Pectinibranchia Pedipalpi Pelecypoda Pelmatozoa. Pennatulacea. Pentastomida. Peracarida. Perischoechinoidea. Peritrichida. Periwinkle. Phalangida. Phanerozonia. Pharetronida Phoronida. Phreaticoidea. Phylactolaemata. Phyllocarida. Phymosomatoida. Phytomastigophorea. Phytomonadida. Pinworm. Plasmodroma. Platyasterida. Platycopa. Platyctenea Platyhelminthes Plecoptera. Plectoidea Podocopa. Poecilosclerida. Poeobioidea. Pogonophora. Polychaeta Polycladida. Polymastigida Polymera Polyplacophora. Porifera. Porocephalida. Portuguese man-of-war. Priapuloidea. Prosobranchia. Protandry. Proteocephaloidea. Proteomyxida Proterostomia. Protobranchia Protomastigida. Protozoa. Protozoology. Protremata. Protura. Pseudocoelomata. Pseudophyllidea Pseudoscorpionida. Psocoptera Pterobranchia. Pterygota. Ptychodactiaria Pulmonata Pycnogonida. Pygasteroida. Radiata. Radiolarida. Regularia. Reticulosa. Rhabdiasoidea. Rhabditoidea. Rhabdocoela. Rhizocephala. Rhizomastigida. Rhizopodea. Rhizostomeae Rhombifera. Rhynchobdellae. Rhynchocoela. Ricinulei. Rock shell Rotifera. Sand dollar. Sarcodina. Sarcoptiformes. Sarcosporidia. Scale insect Scallop. Scaphopoda. Schizocoela Schizogregarinida. Scleractinia. Scorpion Scorpionida. Scyphozoa Sea cucumber Sea fan. Sea squirt. Sea urchin Seisonacea. Semaeostomeae. Sepioidea. Septibranchia. Shipworm Shrimp Silverfish. Siphonaptera Siphonophora. Sipunculoidea Slug (zoology). Snail Solpugida. Somasteroidea. Sow bug Sparganosis. *Spatangoida.* Spelaeogriphacea. Spider Spinulosa Spirotricha Spiruroidea Spittle insect Sponge Sporozoa. Springtail Squash bug Starfish. Statoblasts. Stauromedusae. *Stenolaemata Stenurida. Stirodonta* Stolonifera. Stomatopoda Stone fly Strongyloidea. Stylasterina. Suctorida. Sycettida. Symphyla Syncarida Tanaidacea. Tapeworm *Tardigrada Tarnished plant bug.* Taxodonta Tectibranchia Telestacea Telosporidea. Telotremata. Temnopleuroida Tentaculata Termite. Testacida. Tetrabranchia Tetractinomorpha. Tetraphyllidea. Teuthoidea Thaliacea. Thecanephria. Thermosbaenacea. Thigmotrichida Thoracica. Thrip. Thy-

sanoptera Thysanura Tick. Tintinnida. Tooth shell Tortoise Trachylina. Treehopper. Trematoda Treptostomata. Trichomonadida Trichoptera. Trichostomatida Trichuroidea. Tricladida. Trilobita Trochophore Trombidiformes. Trypanorhynchа Trypanosomatidae. Tunicata Turbellaria. Tylenchoidea. Uropygi. Valvata. Valvifera. Vampyromorpha. Verrucomorpha. Walking stick. Wasp Water boatman. Water bug Water flea. Water strider Weevil Wheel bug. Whelk Worm Xiphosura Zoantharia Zoanthidea Zoology. Zoomastigophorea. Zoraptera

For classification *see* ANIMAL SYSTEMATICS, for fossil groups *see* PALEONTOLOGY.

Low-temperature physics

See SOLID-STATE PHYSICS.

Machine design

See MECHANICAL ENGINEERING.

Marine engineering

See MECHANICAL ENGINEERING; NAVAL ARCHITECTURE.

Mathematics

Addition Algebra. Analysis of variance Analytic geometry Angle Arc (mathematics) Area Asymptote Barycentric calculus. Bessel functions Beta function Binary number system. Binomial theorem Boolean algebra Calculus, differential and integral Calculus of tensors. Calculus of variations Calculus of vectors Cardioid. Catenary Centroids of areas and lines Chord Circle Combinations and permutations. Complex numbers and complex variables. Cone Conformal mapping. Conic section Coordinate systems, graphical. Cube Curve fitting Cycloid. Cylinder. Decimal number system. Descriptive geometry Determinant Diameter Differential equation Differentiation Dihedron Discriminant Distribution (probability) Division Dyadic. e Ellipse Ellipsoid and spheroid Elliptic function and integral Epicycloid. Equations, theory of Exponent Extrapolation Fiber bundle. Fourier series and integrals. Game theory Gamma function. Gauss' theorem Geometry, differential Geometry, euclidean Geometry, noneuclidean. Geometry, Riemannian. Gradient of a scalar Graph theory. Graphic methods Green's theorem Group theory Helix Hexagon Hyperbola Hyperbolic function Hyperboloid Infinity Information theory. Integral transform Integration Interpolation Involute Laplace's differential equation Laplace transform Laplacian. Lattice (mathematics) Least squares, method of. Lemniscate (of Bernoulli). Line Line integral. Linear programming. Linear systems of equations. Lissajous figures Logarithm. Logic. Lorentz transformations Manifold Mathematical notation, contemporary Mathematics Matrix calculus. Matrix theory Monte Carlo method Multiplication. Nomograph. Normal. Number systems. Number theory. Numerical analysis. Octagon Octahedron. Octal number system Operator theory. Orthogonal polynomials. Parabola. Paraboloid. Parallelepiped. Parallelogram. Parameter. Parametric equation Partial differentiation. Pentagon. Perturbation (mathematics). Plane. Point. Polar triangle. Polygon Polyhedron. Polynomial systems of equations. Polytopes, regular. Potentials (mathematics). Prism. Prismatoid and prismoid Probability. Progression (mathematics). Projective geometry. Protractor. Pyramid and frustum Pythagorean theorem Quadric surface. Quadrilateral. Quaternions. Queueing theory. Radian measure. Radius. Real variable Rectangle. Ring theory. Root (mathematics) Root mean-square. Rose curve. Scalar. Series Set theory. Significant figure. Slope. Solid (geometric). Sphere Spherical harmonics. Spheroid Spiral. Square. Statistics Stochastic process. Stokes' theorem [illegible]
rev [illegible]
To[illegible]
Trigonometric curve. Trigonometry, plane. Trigonometry, spherical. Trihedron Variable (discrete and continuous). Vector (mathematics). Zero.

For applications of mathematics to the various scientific and engineering fields see the particular field of interest.

Mechanical engineering

Acceleration analysis. Accelerometer. Ackerman steering Air brake. Air compressor. Air conditioning. Air conditioning, automotive. Air cooling. Air filter Allowance. Anharmonic oscillator Assembly methods Atomic energy Automobile. Automobile brake Automotive air suspension. Automotive body. Automotive chassis Automotive engine. Automotive frame Automotive steering. Automotive suspension. Automotive vehicle. Axle. Ball-bearing pulverizer. Bearings, antifrictional. Belt. Belt drive. Block and tackle Blowpipe. Boiler feed water. Boiler water. Bolt. Bolted joint. Boring. Bourdon-spring pressure gage. Brayton cycle Broaching Buffing Buhrstone mill Bulk-handling machines. Bulldozer Burning velocity measurement. Bushing. Caliper. Cam mechanism. Carburetor [illegible]

[illegible] chamber. Combustion knock Combustion wave measurement. Comfort control Comparator. Compression ratio Compressor Condenser, vapor. Connecting rod. Construction equipment Contact condenser. Convection (heat). Conveying machines. Conveyor. Cooling tower Cotter pin. Coupling. Crane hoist. Crane hook Crank. Crushing and pulverizing [illegible]

ice. Ducted fan. Dynamometer. Earthmover. Economizer and air heater. Efficiency. Electric furnace. Electromagnetic pump. Electroplating of metals. Electropolishing. Elevating machines. Energy sources. Engine. Engine cooling. Escalator. Escapement. Excavator. Explosive forming. Extrusion. Fan. Feed water. Fire-tube boiler. Fluid coupling. Flywheel. Force fit. Forging. Fossil fuel. Four-bar linkage. Friction. Fuel injection. Fuel pump. Fuel systems. Furnace (steam generating). Furnace construction. Gages. Gas furnace. Gas turbine. Gasket. Gear. Gear cutting. Gear drive. Gear loading. Gear train. Governor. Grab bucket. Grinding. Grinding mill. Gyrocompass. Gyroscope. Harmonic oscillator. Heat exchanger. Heat pump. Heat radiation. Heat transfer. Heating, comfort. Hoisting machines. Honing. Hot-water heating system. Humidification. Humidistat. Humidity control. Hydraulic actuator. Hydraulic press. Hydraulic turbine. Hydraulic valve lifter. Hydraulics. Hygrometer. Ice manufacture. Ignition systems. Impulse turbine. Inclined plane. Industrial meteorology. *Industrial trucks. Inertial guidance system.* Instrumentation. Internal combustion engine. Jig, fixture, and die design. Joint, mechanical. Lapping. Lathe. Level measurement. Lever. Link. Linkage, mechanical. Loading, transverse. Loads, dynamic. Loads, repeated. Location fit. Locomotive. Lubrication, engine. Machine. Machine design. Machine elements. Machine key. Machinery. Machining operations. Magnetic separation methods. Magneto. Manifold, engine. Manometer. Marine boiler. Marine engine. Marine engineering. Marine machinery. Marine refrigeration. Materials handling machines. McLeod gage. Mechanical advantage. Mechanical engineering. Mechanisms. Metal forming. Micrometer. Milling machine. Moisture-content measurement. Monorail. Motorcycle. Nailing. Nibbling. Nuclear power. Nut. Octane number. Oil furnace. Oldham's coupling. Otto cycle. Overdrive. Packing. Packing house. Panel heating and cooling. Pantograph. Pawl. Pebble mill. Peening. Pelton wheel. Pendulum. Pile driver. Pirani gage. Planer. Plate, structural. Planetary gear train. Polishing. Power plant. Press fit. Pressure measurement. Pressure vessel. Prime mover. Product design. Prony brake. Psychrometer. Psychrometrics. Pulley. Pump. Pumping machinery. Radiant heating. Radiator. Rankine cycle. Ratchet. Raw water. Reactor, nuclear. Reactor, ship propulsion. Reaction turbine. Reamer. Refrigerated truck. Refrigeration. Refrigeration cycle. Refrigerator. Refrigerator car. Register, air. Reheating. Reliability of equipment. Ring. Rivet. Riveted joint. Roll mill. Rolling, metal. Rolling contact. Rope. Rope drive. Running fit. Safe. Safety factor. Safety valve. Sawing. Screening. Screw. Screw fastener. Screw jack. Screw threads. Seal, pressure. Separation (mechanical). Sewing machine. Shaft balancing. Shafting. Shaper. Sheet metal forming. Shock absorber. Shock isolation. Shock-absorber cord. Shovel, power. Shrink fit. Simple machine. Size reduction. Slider crank mechanism. Sliding pair. Snap ring. Solar energy. Solar heating. Solids pump. Spark plug. Spectroscopy of combustion. Speedometer. Sprinkler, automatic. Spinning of metal. Splines. Spring (mechanical). Steam. Steam boiler. Steam condenser. Steam engine. Steam generating unit. Steam heating. Steam jet ejector. Steam separator. Steam temperature control. Steam turbine. Steering, power. Stoker. Straight line mechanism. Stroboscope. Structural connections. Superheater. Surface condenser. Tachometer. Tank. Taper pin. Temperature-humidity index. Thermal expansion. Thermodynamic cycle. Thermostat. Threading. Tie rod. Tire. Toggle. Tolerance. Ton of refrigeration. Tooling. Torque. Torque converter. Torsion bar. Torsion bar suspension. Tracer, radioactive. Tractor. Transducer. Transmission, automotive. Truck. Tube-still heater. Tumbling mill. Tuning fork. Turbine. Turnbuckle. Turning (woodworking). Typewriter. Universal joint. Unloader. Vacuum cleaner. Vacuum pump. Valve. Valve train. Vapor cycle. *Vapor lock. V-belt. Velocity analysis. Ventilation.* Vibration damping. Vibration isolation. Vibration machine. Vibration pickup. Voltage regulator, automotive. Volumetric efficiency. Warm air heating system. Washer. Water power. Water-tube boiler. Wedge. Welded joint. Water hammer. Wheel and axle. Wheel base. Wind power. Wire. Woodworking.

For articles on rigid and fluid mechanics, strength of materials and related topics *see* ENGINEERING MECHANICS. For basic thermodynamic laws, principles and processes *see* THERMODYNAMICS. For articles on materials *see* INORGANIC CHEMISTRY; METALLURGICAL ENGINEERING; ORGANIC CHEMISTRY. For articles on lubricants *see* PETROLEUM CHEMISTRY. For articles on machinability, plating, welding and other metallurgical topics *see* METALLURGICAL ENGINEERING. For articles on structures *see* CIVIL ENGINEERING. For aeronautical structures *see* AERONAUTICAL ENGINEERING.

See also CONTROL SYSTEMS ENGINEERING; NUCLEAR ENGINEERING.

Mechanics

For engineering applications *see* ENGINEERING MECHANICS. For classical theoretical concepts *see* CLASSICAL MECHANICS. For statistical, quantum and relativistic mechanics *see* ATOMIC PHYSICS; MOLECULAR PHYSICS; SOLID-STATE PHYSICS; THEORETICAL PHYSICS.

Medical microbiology

Ablastin. Acnidosporidea. Actinomycetaceae. Actinomycosis. Actinomyxidia. Actinophage. Adeleida. Adenovirus. Aerobacter. Agglutination reaction. Agglutinin. Allergy, atopic. Ameba. Amebiasis. para-Aminosalicylic acid. Amoebida. Anaphylaxis. Animal virus. Anthrax. Antibacterial agents. Antibiotic. Antibody. Antigen. Antigen-antibody reac-

tion Antimicrobial agents. Antiseptic. Antitoxin. Aphelenchoidea Arbor viral encephalitides. Arthus reaction Ascariasis. Ascaridida. Ascaridina. Ascaridoidea Ascaris Ascomycetes. Aspergillosis. Avian leukosis Bacillaceae. Bacillary dysentery. Bacteria Bacteria, lysogenic. Bacteriology, medical Bacteriophage Bacteroidaceae Balantidiasis. Bejel Biological specificity. Biologicals. Blackleg. Blastomycosis. Botulism. Brucellaceae Brucellosis Candidiasis. Carrion's disease. Cat scratch disease. Cercaria Cestoda. Chagas' disease. Chemotherapy. Chickenpox and shingles Cholera vibrio Chromomycosis Clonorchiasis Cnidosporidia. Coccidia Coccidioidomycosis Coenurosis Cold, common Coliphage Complement (serum). Complement fixation test Conglutination. Corynebacteriaceae Coxsackie virus Cryptococcales. Cryptococcosis Culture, elective. Culture, embryonated egg Culture, media components of. Culture, pure. Culture, tissue. Culture technique Cyclophyllidea Cysticercosis. Cystitis Dengue fever Dermatophytosis. Digenea Dioctophymoidea Diphtheria Disease Disease carrier Dracunculoidea Drug resistance Echinococcosis. ECHO virus. Effective dose 50 Eimeriida Encephalitis, equine. Endocarditis Enteric bacilli Enterobacteriaceae. Enterovirus Epidemic Epidemiology Escherichia Eubacteriales Exanthem subitum. Fascioliasis. Fasciolopsiasis Fever Fièvre boutonneuse. Filariasis. Filarioidea Flea Food poisoning, bacterial Foot and mouth disease Fungistat and fungicide Gaffkya tetragena. Gangrene, gas Germ German measles Germfree vertebrate Glanders Gonorrhea Granuloma inguinale Griseofulvin Guinea worm infection Haemosporidiida Heartwater disease Hemadsorption viruses. Hemophilic bacteria Hemorrhagic septicemia Herpes simplex Heterophile antigen Hetero...

...ncà inclusion bodies (virus). Infant diarrhea Infection Infection, lytic Infectious disease control Infectious disease transmission Infectious mononucleosis Infective dose 50 Influenza Isoantigen Isonicotinic acid hydrazide Johne's disease. Keratoconjunctivitis (epidemic) Klebsiella pneumoniae Lactobacillaceae. Lancefield differentiation scheme Leishmaniasis Leprosy. Leptospira Lethal dose 50 Leukocidin Listeriosis Louping-ill. Lymphocytic choriomeningitis Lymphogranuloma venereum Lymphogranuloma-psittacosis group. Lysin Lytic reaction Malaria Mastitis (cows) Measles Melioidosis. Meningitis Meningococcus Microbiological methods Microscope, electron Microscope, fluorescence Microscope, optical Microsporidia Molluscum contagiosum Monhysteroidea Moniliaceae. Moniliales Moraxella lacunata. Mouse viral leukemias Mumps Mycology, medical Myiasis. Myxomatosis, infectious (rabbits) Myxosporidia Myxovirus Nematoda Neutralization reaction (antibody). Neutralizing antibody. Newcastle disease. Nitrofuran. Nocardiosis. Nystatin Opsonin. Papillomatosis, infectious (rabbit). Paracolon bacilli. Paragonimiasis. Parapertussis. Parasitology, medical Paratyphoid fever. Paratyphoid gastroenteritis. Phagocytosis. Phlebotomus fever. Phycomycetes Pink eye. Pinta. Pinworm. Pinworm infection Plague. Pleuropneumonia like organism (PPLO). Pneumocystosis. Pneumonia. Pneumonitis. Poliomyelitis. Precipitin Precipitin test. Properdin. Proteus. Pseudomonadaceae Pseudomonas aeruginosa. Pseudophyllidea. Psittacosis Public health. Q fever. Quellung reaction Rabies. Rat bite fever. Relapsing fever. Rhabdiasoidea. Rhabditoidea. Rheumatic fever. Rickettsiales. Rickettsialpox. Rickettsioses Rous sarcoma. Salivary gland virus disease. Salmonella Sarcosporidia. Scarlet fever. Schistosomiasis. Septicemia. Serology. Shigella. Skin test Sleeping sickness, African Smallpox. Soft chancre. Sparganosis. Spirillaceae. Spirochete. Sporotrichosis. Sporozoa Spotted fever, Rocky Mountain Spotted fever group. Staphylococcus. Streptococcus Strongyloidea Strongyloidiasis. Sulfa drugs. Sulfone (antimicrobial use). Syphilis. Tapeworm Tapeworm disease Tetanus. Thiosemicarbazone Tick Tick bite fever, South African. Tick fever, Colorado Tick paralysis. Tick typhus, North Queensland Tick typhus, Siberian Toxin, bacterial Toxin-antitoxin reaction Toxoplasmosis. Trachoma Trench fever Trichinosis. Trichomoniasis Trichuroidea. Trypanosomatidae. Tuberculosis. Tularemia Tumor viruses Tylenchoidea. Typhoid fever. Typhus, scrub. Typhus fever, endemic (flea-borne) Typhus fever, epidemic (louse-borne). Vaccination Venereal disease. Vincent's angina. Virulence Virus. Wart Weil's disease. West Nile fever Whipworm disease Whooping cough. Yaws. Zoonoses

For more information on oncology and other disease processes *see* ANIMAL PATHOLOGY; for the chemistry of the physiological processes *see* BIOCHEMISTRY.

See also MICROBIOLOGY.

Metallurgical engineering

Alloy Alloy structures. Arc welding Atomic bomb Beryllium alloys. Beryllium metallurgy. Brass Brazing Brittleness. *Bronze* Cadmium metallurgy. Cast iron Cermet. Cladding Copper alloys. Corrosion. Creep of materials Drawing of metal Elastic limit ...

platin...

trusio...

Forgi... ...ys Gold metallurgy Grain boundaries (metallurgy). Hardness scales. Heat-treatment (metals and alloys). Hooke's law. Hydrogen bomb Hydrometallurgy. Iron (extraction from ore). Iron alloys. Iron-silicon alloys Lead alloys. Lead metallurgy. Machinability (metals) Magnesium alloys. Metal. Metal, mechanical properties of. Metal and mineral ...

ice Ducted fan. Dynamometer. Earthmover. Economizer and air heater. *Efficiency. Electric furnace.* Electromagnetic pump. Electroplating of metals. Electropolishing. Elevating machines. Energy sources. Engine. Engine cooling. Escalator. Escapement. Excavator. Explosive forming. Extrusion. Fan. Feed water. *Fire-tube boiler. Fluid coupling.* Flywheel. Force fit. Forging. Fossil fuel. Four-bar linkage. Friction Fuel injection. Fuel pump. Fuel systems. Furnace (steam generating). Furnace construction. Gages. Gas furnace Gas turbine Gasket. Gear. Gear cutting Gear drive. Gear loading. Gear train. Governor. Grab bucket. Grinding. Grinding mill. Gyrocompass Gyroscope. Harmonic oscillator. Heat exchanger. Heat pump Heat radiation. Heat transfer. Heating, comfort. Hoisting machines. Honing. Hot-water heating system Humidification. Humidistat. Humidity control. Hydraulic actuator. Hydraulic press Hydraulic turbine. Hydraulic valve lifter. Hydraulics. Hygrometer. Ice manufacture Ignition systems. Impulse turbine. Inclined plane. Industrial meteorology *Industrial trucks. Inertial guidance system.* Instrumentation. Internal combustion engine. Jig, fixture, and die design. Joint, mechanical. Lapping Lathe Level measurement. Lever. Link. Linkage, mechanical. Loading, transverse. Loads, dynamic *Loads, repeated.* Location fit Locomotive Lubrication, engine Machine. Machine design Machine elements. Machine key. Machinery. Machining operations. Magnetic separation methods. Magneto Manifold, engine. Manometer. Marine boiler. Marine engine. Marine engineering Marine machinery. Marine refrigeration. Materials handling machines. McLeod gage. Mechanical advantage. Mechanical engineering. Mechanisms. Metal forming Micrometer. Milling machine Moisture-content measurement. Monorail Motorcycle Nailing. Nibbling. *Nuclear power. Nut.* Octane number *Oil* furnace. Oldham's coupling. Otto cycle Overdrive. Packing. Packing house Panel heating and cooling Pantograph. Pawl. Pebble mill. Peening Pelton wheel. Pendulum. Pile driver. Pirani gage. Planer *Plate, structural Planetary gear train.* Polishing Power plant. Press fit. Pressure measurement. Pressure vessel. Prime mover. Product design. Prony brake. Psychrometer. Psychrometrics Pulley Pump. Pumping machinery Radiant heating. Radiator Rankine cycle. Ratchet. Raw water Reactor, nuclear. Reactor, ship propulsion Reaction turbine Reamer. Refrigerated truck Refrigeration. Refrigeration cycle. Refrigerator. Refrigerator car Register, air. Reheating Reliability of equipment. Ring. Rivet. Riveted joint. Roll mill Rolling, metal Rolling contact. *Rope. Rope drive. Running fit* Safe. Safety factor. Safety valve. Sawing. Screening. Screw. Screw fastener. Screw jack Screw threads. Seal, pressure. Separation (mechanical) Sewing machine. Shaft balancing. Shafting. Shaper. *Sheet metal forming* Shock absorber. Shock isolation. Shock-absorber cord Shovel, power. Shrink fit Simple machine. Size reduction. Slider crank mechanism *Sliding pair. Snap ring. Solar energy.* Solar heating. Solids pump. Spark plug. Spectroscopy of combustion. Speedometer. Sprinkler, automatic. Spinning of metal. Splines. Spring (mechanical). Steam. Steam boiler. Steam condenser. *Steam engine. Steam generating unit. Steam heating.* Steam jet ejector. Steam separator. Steam temperature control Steam turbine. Steering, power Stoker. Straight line mechanism. Stroboscope. Structural connections Superheater. Surface condenser. Tachometer. Tank. Taper pin. Temperature-humidity index. Thermal expansion. Thermodynamic cycle. Thermostat. Threading. Tie rod. Tire. Toggle. Tolerance. Ton of refrigeration. Tooling. Torque. Torque converter. Torsion bar. Torsion bar suspension. Tracer, radioactive. Tractor. Transducer. Transmission, automotive. Truck. Tube-still heater. Tumbling mill Tuning fork Turbine Turnbuckle. Turning (woodworking). Typewriter. Universal joint. Unloader. Vacuum cleaner. Vacuum pump. Valve. Valve train. Vapor cycle. Vapor lock. *V-belt. Velocity analysis. Ventilation* Vibration damping. Vibration isolation. Vibration machine. Vibration pickup. Voltage regulator, automotive. Volumetric efficiency. Warm air heating system. Washer. Water power Water-tube boiler. *Wedge. Welded joint. Water hammer. Wheel and* axle. Wheel base. Wind power. Wire Woodworking

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Mechanics

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Medical microbiology

Ablastin Acnidosporidea. Actinomycetaceae Actinomycosis. Actinomyxidia. Actinophage. Adeleida. Adenovirus Aerobacter. Agglutination reaction. Agglutinin Allergy, atopic Ameba. Amebiasis para Aminosalicylic acid Amoebida. Anaphylaxis Animal virus Anthrax Antibacterial agents Antibiotic Antibody. Antigen. Antigen antibody reac

cycline. Pasteurization. Pathogen (soil). Penicillin. Petroleum microbiology. Phycomycetes. Polymyxin. Propionibacteriaceae Protophyta. Pseudomonadaceae. Pseudomonadales. Pseudomonadineae. Rhizobiaceae. Rhizosphere. Rhodobacterineae. Riboflavin Rickettsiales. Rust (microbiology). [illegible] ophyceae. [illegible] Soil bal- [illegible] microorganisms. Soil mineral (microbial utilization) Soil phosphorus (microbial cycle). Sphaerioidaceae. Sphaeropsidales Spirillaceae. Spirochaetales Sporobolomycetales Stain (microbiological). Sterilization Steroid. Stilbellaceae Streptomycetaceae. Streptomycin. Subtilin Tetracycline. Textile microbiology Thiobacteriaceae Tuberculariaceae. Tyrothricin. Uredinales. Ustilaginales Vinegar Viomycin Virales. Vitamin B_{12}. Water analysis Water microbiology. Water purification. Water borne disease. Wine. Yeast Yeast, industrial Zythiaceae.

For articles on the chemical reactions in physiology see BIOCHEMISTRY; for more informa tion on *plant diseases* caused by microorganisms see PLANT PATHOLOGY

See also ANIMAL PATHOLOGY; MEDICAL MICROBIOLOGY

Microscopy

See BIOPHYSICS, ELECTROMAGNETIC RADIATION, OPTICS

Mineralogy

For articles pertaining to rocks and minerals *see* GEOLOGY (MINERALOGY AND PETROLOGY); for additional treatment of related geochemical processes *see* GEOCHEMISTRY

Mining engineering

Assaying Ball bearing pulverizer Boring and drilling, mineral Buhrstone *mill* *Bulk-handling* machines Classification mechanical Coal mining Conveying machines Conveyor Core drilling Crushing and pulverizing Drilling machine Elevating machines. Grinding mill Hoisting machines. Industrial trucks Materials handling machines Mining Mining, open-cut or pit. Mining, placer Mining, strip Mining, underground. Mining excavation Mining machinery. Mining operating facilities Mining safety Pebble mill Prospecting. Quarrying Roll mill Safety lamp. Screening Separation (mechanical) Size reduction. Tumbling mill Ventilation Well logging (mineral).

See also PETROLEUM ENGINEERING.

Molecular biology

See BIOPHYSICS, CYTOLOGY; GENERAL PHYSIOLOGY

Molecular physics

Absorption (electromagnetic radiation). Adhesion, molecular. Angstrom. Atom. Atomic clock. Atomic structure and spectra. Boltzmann statistics. Boltzmann transport equation. Bose-Einstein statistics. Brownian movement. Chemical binding Chemical compounds. Chemical structures. Chemistry. Chromatography. Cohesion (physics). Collision. Crystallization. Degeneracy (quantum states). Eigenfunction Eigenvalue. Electron. Electron configuration. Electron diffraction Electron paramagnetic resonance spectroscopy. Electron spin. Electronegativity. Energy level (quantum mechanics). Excited state. Exclusion principle. Fermi-Dirac statistics. Flame photometry. Franck-Condon principle. Ground state. Harmonic motion. Harmonic oscillator. Hydrogen bomb Inorganic chemistry. Intermolecular forces Magnetic resonance. Maser. Microwave spectroscopy. Molecular association. Molecular beams. Molecular physics. Molecular structure and spectra. Molecular weight Molecule. Neutron diffraction Nuclear moments Organic chemistry. Paramagnetism. Perturbation (quantum theory) Planck's constant. Polarimetric analysis. Quantum (physics). Quantum mechanics. Quantum numbers Quantum statistics Quantum theory, nonrelativistic Radiation chemistry. Radiofrequency spectroscopy Rheology Ritz's combination principle Schrodinger's wave equation. Selection rules (physics). Spin (quantum mechanics). Stark effect. Stationary state. Statistical mechanics Thermoanalysis. Uncertainty principle Wave physics. X-ray crystallography X-ray diffraction. Zeeman effect.

See also ATOMIC PHYSICS

Morphogenesis

See GROWTH AND MORPHOGENESIS.

Morphology

See ANIMAL ANATOMY; CYTOLOGY; GROWTH AND MORPHOGENESIS; HISTOLOGY, INVERTEBRATE ZOOLOGY, PALEOBOTANY, PALEONTOLOGY, PLANT ANATOMY, VERTEBRATE ZOOLOGY

Mycology

Actinomycetaceae [illegible]

[illegible] Eurotiales Fungi. Fungi Imperfecti. Fungistat and fungicide Griseofulvin. Heterobasidiomycetidae Histoplasmosis. Homobasidiomycetidae. Hypersensitivity. Melanconiales Meningitis. Microbiological methods Moniliaceae Moniliales. Mycelia Sterilia Myriangiales Nocardiosis Phycomycetes. Rhizosphere Rust (*microbiology*). Saccharomycetales. Smut (microbiology) Sphaeriales

ing. Metal coatings. Metal forming. Metal inspection, magnetic. Metal inspection, ultrasonic. Metallography. Metallurgy. Nickel alloys. Nickel metallurgy. Nose cone. Ore dressing. Permalloy. Pewter. Plastic deformation of metal. Powder metallurgy. Pyrometallurgy. Pyrometallurgy, nonferrous. Radioactivity (applications). Radiography of metals. Resilience. Rheology. Rocket. Rolling, metal. Silver alloys. Silver metallurgy. Sintering Soldering. Solid-state physics. Space technology. Spacecraft structures. Spinning of metal. Spot welding. Stainless steel Steel. Steel manufacture Stress and strain. Surface hardening of steel. Tempering. Thermonalysis. Tin alloys Tin metallurgy. Titanium. Titanium metallurgy. Torch. Uranium metallurgy. Vacuum metallurgy. Welding and cutting of metals Wrought iron. X-ray powder method. Young's modulus. Zinc alloys Zinc metallurgy. Zone refining.

For construction applications *see* CIVIL ENGINEERING. For ore supply and location *see* GEOLOGY (MINERALOGY AND PETROLOGY) For the winning of ores and metals from the earth *see* MINING ENGINEERING. For analytical applications and control methods *see* ANALYTICAL CHEMISTRY; PHOTOGRAPHY.

Meteorology and climatology

Aerology. Aeronautical meteorology. Agricultural meteorology. Air Air glow. Air mass Air pressure Air temperature. Air waves, upper synoptic Anemometer. Atmosphere. Atmospheric acoustics Atmospheric adiabatic change. Atmospheric chemistry. Atmospheric electricity. Atmospheric high. Atmospheric low. Atmospheric pollution. Aurora Backing wind. Baroclinic field Barometer. Barotropic field. Bioclimatology. Brocken specter. Chinook. Climatic change. Climatic prediction Climatology Clinometer Cloud. Cloud physics Continentality, weather and climate Coriolis acceleration and force. Cyclone. Degree-day Dendrochronology Dew. Dew point. Drought. Dust storm Environmental protection. Fog Front Frost. Geostrophic wind. Gradient wind. Greenhouse effect, terrestrial Growing season. Hail Halo Heat balance, terrestrial atmospheric. Humidity Hurricane Hydrometeorology. Hygrometer Industrial meteorology. Insolation. Isanomal temperatures Isentropic surfaces Isobar (meteorology). Isopycnic. Isotach. Isothermal chart. Jet stream. Lightning Marine influence on weather and climate Mesosphere. Meteorological instrumentation. Meteorological optics. Meteorological rockets. Meteorological use of satellites. Meteorology. Micrometeorology. Millibar. Mirage Moisture-content measurement. Monsoon. Naval meteorology. Ocean-meteorological relations Polar meteorology. Precipitation (meteorology). Precipitation gages. Psychrometer. Psychrometrics. Radiation, terrestrial. Radioactive fallout Rain shadow. Rainbow. Sensible temperature. Sirocco. Smog. Snow. Solenoid (meteorology). Squall. Storm. Stratosphere. Sundog. Sunshine-duration transmitter. Temperature inversion. Temperature-humidity index. Theodolite. Thunder. Thunderstorm Tornado. Tree-ring hydrology. Tropical meteorology. Tropopause Troposphere. Veering wind. Waterspout. Weather. Weather (forecasting and prediction). Weather map Weather modification. Weather station Wind. Wind measurement. Wind rose. Wind stress. Wind-shift line.

For related physical aspects of earth and atmosphere *see* GEOPHYSICS; for related chemical aspects, *see* GEOCHEMISTRY. For relevant aspects of the interaction of sea and atmosphere *see* OCEANOGRAPHY.

Microbiology

Acetobacter suboxydans fermentation. Acetone-butanol fermentation. Acetone-ethanol fermentation. Achromobacteraceae. Acid-fast stain. Acrasiales. Actinomycetaceae. Actinomycetales. Actinoplanaceae. Amphotericin B Antimicrobial agents. Antibacterial agents. Antibiotic. Antiseptic. Ascomycetes. Axenic culture. Azotobacteraceae. Bacillaceae Bacitracin. Bacteria. Bacteria, taxonomy of Bacterial cell chemistry. Bacterial coenzyme Bacterial endospores. Bacterial enzyme. Bacterial genetics. Bacterial growth Bacterial luminescence. Bacterial metabolism. Bacterial motility. Bacterial nutrition Bacterial physiology. Bacteriology. Bacteroidaceae Basidiomycetes. Beggiatoales Bioassay Brevibacteriaceae Brine, microbiology of. Brucellaceae 2,3-Butanediol. Butter. Carbomycin. Caryophanales Caulobacteraceae. Cheese. Chemostat Chlamydobacteriales. Chloramphenicol Chlortetracycline. Citric acid Corynebacteriaceae Cryptococcales. Culture, elective Culture, media components of. Culture, pure Culture technique. Cycloserine Dematiaceae. Demethylchlortetracycline. Dextran Discellaceae. Distilled spirits. Enterobacteriaceae Enzyme (industrial production). Epoxysuccinic acid Erysiphales Erythromycin Ethyl alcohol Eubacteriales. Eumycetes. Eurotiaceae Eurotiales Fermentation. Food microbiology Food poisoning, bacterial Food preservation Food spoilage. Fumagillin Fumaric acid. Fungi. Fungi Imperfecti Gallic acid. Gluconic acid. Gram's stain Griseofulvin Heterobasidiomycetidae Homobasidiomycetidae Humus Hyphomicrobiales Ice cream Industrial microbiology Itaconic acid Itatartaric acid Kanamycin Kojic acid Labyrinthulales Lactic acid Lactobacillaceae. Leptostromataceae Lyophilization Malt beverage Manure Marine microbiology Melanconiales Methanomonadaceae Microbiology Microbiological methods. Micrococcaceae Microtatobiotes Milk. Moniliaceae Moniales Mushroom Mycelia Sterilia. Mycobacteriaceae Mycoplasmatales. Myriangiales. Myxobacterales Myxomycetes. Neisseriaceae. Neomycin Nitrobacteriaceae Nitrogen cycle. Novobiocin. Nystatin Oxytetra-

chamber Carbon star. Carbon-nitrogen cycle. Chain reaction, nuclear. Cloud chamber. Critical mass. Crystal counter Curie. Curium Cyclotron Deuterium Deuteron Elements (chemical). Fission, nuclear Fusion, nuclear. Gamma rays Half-life. Heavy water. Hydrogen bomb Hyperfine structure. Ionization chamber. Isomerism, nuclear. Isotone. Isotope Linear accelerator Magnetic resonance Magnetogas dynamics. Magnetohydrodynamics. Magneton Mass defect. Mass number. Mean free path Multipole radiation. Neutron. Neutron, delayed Neutron cross section Neutron optics. Nuclear chemistry Nuclear explosion Nuclear moments Nuclear physics Nuclear power. Nuclear radiation. Nuclear reaction. Nuclear structure Nucleon. Nucleonics. Nucleus, atomic. Nuclide. Packing fraction. Pair production (electron positron). Parity (quantum mechanics). Particle accelerator. Particle detector. Pinch effect. Plasma physics Plutonium Positron Probability in physics. *Proton* Proton-proton chain Quantum (physics). Quantum field theory Radiation Radiation chemistry *Radioactive* species produced by cosmic rays. Radioactivity Radioactivity, standards. Radio-frequency spectroscopy Radioisotope. Radium Radon Reactor, nuclear Reactor physics Resonance transformer. Roentgen unit. Scattering experiments, atomic and molecular Scattering experiments *nuclear* Scintillation counter Selection rules *(physics)*. *Spallation* reaction Spin (quantum mechanics). *Strange particle* Symmetry laws (physics). Synchrocyclotron Synchrotron Technetium Thermal neutrons Thermonuclear reaction Thorium *Transmutation* Transuranium. Triton. Uranium Van de Graaff generator V-particle

See also ATOMIC PHYSICS; MOLECULAR PHYSICS, NUCLEAR ENGINEERING.

Oceanography

Antarctic Ocean Antisubmarine warfare Arctic Ocean Atlantic Ocean Atoll Baltic Sea Barrier reef Bathyscaph Bathythermograph Bering Sea. Black Sea Caribbean Sea *Continental* shelf and slope Coral reef Coriolis *acceleration and force* Deep-sea fauna *Delta Echo* sounder. Estuarine oceanography Fringing reef Gulf *of* Mexico Gulf Stream Halocline Harbor. Hydrophone Hydrosphere Hydrosphere geochemistry of. Ice islands Iceberg Indian Ocean. *Mangrove* swamp Marine ecosystem Marine fisheries Marine marsh. *Marine* navigation Marine resources Marine sediments. Mediterranean Sea Naval meteorology North Sea Northwest Passage Ocean currents Ocean waves Ocean meteorological relations. Oceanic islands Oceanography Oceans and seas. Organic reef Pacific Ocean Reef River tides Sargasso Sea Scattering layer SCUBA. Sea. *Sea ice*. Sea level (datum planes) Sea level fluctuations. Sea state Sea water Sea water fertility. Seamount and guyot. Seiche Shore processes Skin *diving* SOFAR Sonar Sonobuoy Southeast Asian *waters* Storm surge. Submarine canyon Submarine topography. Texas Towers. Thermocline. Tidal bore. Tide. Tsunami. Turbidity current. Underwater photography. Underwater sound. Underwater television. Wave (capillary). Wave (internal).

For related geophysical phenomena *see* GEOCHEMISTRY; GEOPHYSICS; METEOROLOGY AND CLIMATOLOGY. For related aspects of marine biology *see* ANIMAL ECOLOGY; PLANT ECOLOGY.

Optics

Aberration of light. Aberration, optical. Absorption Absorption (electromagnetic radiation). Albedo. Angstrom. Aspheric surfaces, optical. Astronomical instruments. Astronomical spectroscopy. Atomic structure and spectra. Band spectrum. Binoculars Black. Brocken specter. Camera. Candle. Candlepower Cathodoluminescence. Chemical microscopy. Chemiluminescence Chromatic aberration Cinematography. Color. Color centers Color vision. Colorimetric analysis. Colorimetry Comparator Compton effect. Crystal optics. DeBroglie wavelength. Dichroism. Diffraction. Diffraction grating. Diopter. Dispersion *(radiation)*. *Doppler* effect Electroluminescence. Electrooptics. *Energy* level (quantum mechanics) *Eyepiece*. Faraday effect Filter, color. Fine structure (spectrum lines). Flame photometry Focal length Foot candle. Foot-lambert Franck-Condon principle. Frequency (wave motion) Fringe (optics). Ghost image. optical Gray Ground state. Gun sights. Huygens' principle *Illuminance Image*, optical Inertia of energy. Interference filter, *optical*. Interference of waves. Interferometry. Isotope *shift*. Kerr effect Lambert. Lantern slides. Latent *image* Lens, optical Light. Light amplifier Light panel. Line spectrum. Lumen. Lumen-hour Luminance. Luminescence Luminosity factor. Luminous efficiency *Luminous* energy. Luminous flux Luminous intensity Luminous paint. Lux Magnetooptics Magnification Meteorological optics. Micron Microscope Mirage Mirror optics. Molecular structure and spectra. Observatory, *astronomical*. Opaque medium. Opera glasses Optical fibers Optical flat. Optical materials Optical methods of chemical analysis. Optical recording. Optical tracking instruments. Optics. Optics, geometrical. Optics, physical Paschen-Back effect Penumbra. Periscope Phosphorescence Phot. *Photon* Photoelasticity Photoelectric devices. *Photoelectricity* Photography. Photography, color. Photoluminescence Photometer. Photometry. Planck's *constant* Pleochroism Point *source*. *Polarimetric* analysis. Polarized light. Prism, optical Projection systems. optical *Projector* (light). *Pyrometer*. Quantitative chemical analysis. Quantum mechanics. Quantum physics [illegible]

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For industrial applications *see* MICROBIOLOGY; for the mycological aspects of plant disease *see* PLANT PATHOLOGY.

Naval architecture

Antisubmarine warfare. Archimedes' principle. Armament, naval. Buoyancy. Center of gravity. Drydocking. Fluid dynamics Fluid mechanics. Fluid-flow principles. Fluid-flow properties. Froude *number. Glider. Hydrodynamics. Hydrofoil craft* Inland waterways transportation. Laminar flow. Landing ships and craft. Model theory. Naval architecture. Propeller, marine. Reynolds number. Seaplane Ship, merchant. Ship, naval Ship de*sign. Ship propulsion. Ship salvage. Shipbuilding.* Similitude. Streamline flow. Streamlining. Submarine. Towing tank. Turbulent flow Underwater demolition. Wake (seagoing vessels). Wake flow. Water tunnel.

For theoretical aspects of fluid flow phenomena *see* FLUID MECHANICS.

Navigation

Accelerometer. Air Almanac. Air navigation Air traffic control Airborne radar. Aircraft compass system. Aircraft low-approach systems. Airport surface detection equipment. Air-speed indicator Altimeter, pressure. Altimeter, radio Astrolabe, prismatic. Azimuth Buoy Celestial navigation Compass, magnetic. Compass, radio Continuous-wave radar Coordinate systems, terrestrial. Corner reflector antenna. Course-line computer. Dead reckoning. Decca Dectra Direction-finding equipment. Doppler radar Geography, mathematical Glide-path indicator. Great circle, terrestrial. Ground-controlled approach system (GCA) Ground-position indicator (GPI). Gyrocompass. Gyroscope Hyperbolic navigation system Inertial [illegible] landing system (ILS) [illegible] Nautical [illegible] ion instruments. Navigation systems, electronic Omega. Passive radar. Piloting. Polar navigation Polar-coordinate navigation systems. Precision approach radar (PAR). Radar Radio. Radio range Schuler pendulum Sextant SOFAR Sonar. Surveillance radar. Tacan Terrain-clearance indicator. Vortac.

For astronomical bodies *see* ASTRONOMY. For articles on the earth's magnetic field *see* GEOPHYSICS. For articles on ocean currents and waves *see* OCEANOGRAPHY. For air currents and aeronautical meteorology *see* METEOROLOGY AND CLIMATOLOGY. For communication equipment *see* COMMUNICATIONS. For automatic control systems *see* CONTROL SYSTEMS ENGINEERING. For *electronic devices and* circuits *see* ELECTRONIC ENGINEERING.

Nuclear engineering

Actinium. Alpha rays. Aluminum. Americium. Atomic bomb Atomic energy. *Background count.* Barn (unit). Beryllium. Beta rays Betatron. Boron Bubble chamber. Cadmium. Carbon. Ceramic chemistry. Cerenkov radiation. Cermet. Chain reaction, nuclear. Chemical engineering Cloud chamber. Cockcroft-Walton accelerator. Cosmic rays. Criti*cal mass Crystal counter. Curie. Cyclotron.* Decontamination (radioactive contaminants). Deuterium Dosimeter. Ducted flow. Electromagnetic pump. Energy sources. Film badge. Fission, nuclear. Flow measurement. Flow of fluids. Fluid-*flow principles* Fluid-flow properties. Fusion, nuclear Gamma rays Geiger-Müller counter. Geophysical exploration. Graphite. Hafnium. Half-life Health physics. Heat exchanger. Heavy water. Helium Hydrazine Hydrogen bomb. Impulse generator. *Indium Ion exchange. Ionization chamber.* Irradiation, isotropic. Isomerism, nuclear. Isotope Isotope dilution techniques Isotope separation (stable isotopes). Lanthanum Lead. Linear accelerator Low-level counting Luminous paint. Magnetogas dynamics. Magnetohydrodynamics. Mass number Mean free path Monitoring (ionizing radiation). Neutron. Neutron, delayed Neutron cross section Nonstoichiometric compounds. Nuclear aircraft propulsion. Nuclear battery. Nuclear chemistry Nuclear engineering Nuclear explosion Nuclear fuels Nuclear fuels reprocessing. Nuclear power Nuclear radiation Nuclear reaction Nuclear rocket. Nucleonics. Nucleus, atomic. Nuclide. Particle accelerator Particle detector. Pinch effect *Pipe flow* Plasma physics Plutonium. Polonium Propulsion Prospecting Proton Rad Radiation Radiation damage (inanimate materials). Radiation shielding Radioactive fallout Radioactive waste disposal. Radioactivity Radioactivity (applications) Radioactivity, standards Radiochemical laboratory Radiochemistry Radioisotope Radioisotope assay. Radioisotope production. Radiometric assay Radium Reactor, nuclear Reactor, nuclear (classification) Reactor, ship propulsion. *Reactor* physics Refractory Resonance transformer Rocket Rocket engine Roentgen unit Saline water reclamation Scintillation counter. Scintillation detector, liquid Silver Sintering. *Size* reduction Spark counter Stainless steel Stripping Synchrocyclotron Synchrotron Thermal expansion Thermal neutrons Thermal stress Thermocouple Thermonuclear reaction Thorium Thulium. Tracer, radioactive Transmutation. Transuranium elements Tritium Unit operation Uranium Uranium metallurgy *Van de Graaff generator* Well logging Xenon Zirconium.

See also NUCLEAR PHYSICS

Nuclear physics

Absorption Absorption (electromagnetic radiation) Actinium Alpha rays Americium Antimatter. Astatine. Astrophysics. Atom Atomic bomb Atomic energy. Atomic mass unit. Atomic number Atomic weight. Barn (unit) Baryon Berkelium Beta rays. Betatron. Binding energy, nuclear Bismuth. Boltzmann transport equation Bubble

chamber. Carbon star. Carbon nitrogen cycle. Chain reaction, nuclear Cloud chamber. Critical mass. Crystal counter. Curie. Curium Cyclotron. Deuterium Deuteron Elements (chemical). Fission, nuclear Fusion, nuclear. Gamma rays. Half-life. Heavy water Hydrogen bomb Hyperfine structure Ionization chamber. Isomerism, nuclear. Isotone. Isotope Linear accelerator. Magnetic resonance. Magnetogas dynamics. Magnetohydrodynamics Magneton Mass defect Mass number. Mean free path Multipole radiation. Neutron. Neutron, delayed Neutron cross section. Neutron optics. Nuclear chemistry Nuclear explosion Nuclear moments Nuclear physics. Nuclear power Nuclear radiation Nuclear reaction. Nuclear structure Nucleon. Nucleonics. Nucleus, atomic. Nuclide Packing fraction. Pair production (electron-positron). Parity (quantum mechanics). Particle accelerator Particle detector. Pinch effect Plasma physics Plutonium. Positron. Probability in physics, Proton Proton-proton chain Quantum (physics). Quantum field theory. Radiation Radiation chemistry Radioactive species produced by cosmic rays. Radioactivity. Radioactivity, standards. Radio-frequency spectroscopy Radioisotope. Radium. Radon. Reactor, nuclear. Reactor physics. Resonance transformer. Roentgen unit Scattering experiments, atomic and molecular. Scattering experiments, nuclear Scintillation counter Selection rules (physics) Spallation reaction Spin (quantum mechanics) Strange particle. Symmetry laws (physics) Synchrocyclotron. Synchrotron. Technetium Thermal neutrons. Thermonuclear reaction. Thorium Transmutation Transuranium Triton Uranium Van de Graaff generator. V-particle

See also Atomic physics; Molecular physics, Nuclear engineering

Oceanography

Antarctic Ocean Antisubmarine warfare Arctic Ocean. Atlantic Ocean. Atoll Baltic Sea Barrier reef Bathyscaph. Bathythermograph Bering Sea Black Sea Caribbean Sea Continental shelf and slope Coral reef Coriolis acceleration and force. Deep-sea fauna. Delta Echo sounder Estuarine oceanography Fringing reef Gulf of Mexico Gulf Stream Halocline Harbor. Hydrophone Hydrosphere. Hydrosphere geochemistry of Ice islands Iceberg Indian Ocean Mangrove swamp Marine ecosystem Marine fisheries Marine marsh Marine navigation. Marine resources Marine sediments Mediterranean Sea Naval meteorology North Sea Northwest Passage. Ocean currents. Ocean waves. Ocean meteorological relations Oceanic islands Oceanography Oceans and seas Organic reef Pacific Ocean Reef River tides Sargasso Sea. Scattering layer SCUBA Sea Sea ice. Sea level (datum planes) Sea level fluctuations Sea state. Sea water Sea water fertility Seamount and guyot. Seiche Shore processes Skin diving SOFAR Sonar Sonobuoy. Southeast Asian waters Storm surge. Submarine canyon. Submarine topography Texas Towers. Thermocline. Tidal bore. Tide. Tsunami. Turbidity current. Underwater photography. Underwater sound. Underwater television. Wave (capillary). Wave (internal).

For related geophysical phenomena *see* Geochemistry; Geophysics; Meteorology and climatology. For related aspects of marine biology *see* Animal ecology; Plant ecology.

Optics

Aberration of light. Aberration, optical. Absorption Absorption (electromagnetic radiation). Albedo. Angstrom. Aspheric surfaces, optical. Astronomical instruments. Astronomical spectroscopy Atomic structure and spectra. Band spectrum Binoculars Black. Brocken specter. Camera. Candle Candlepower. Cathodoluminescence. Chemical microscopy Chemiluminescence. Chromatic aberration Cinematography Color. Color centers Color vision. Colorimetric analysis Colorimetry. Comparator Compton effect. Cystal optics DeBroglie wavelength Dichroism. Diffraction. Diffraction grating Diopter. Dispersion (radiation). Doppler effect Electroluminescence Electrooptics. Energy level (quantum mechanics). Eyepiece. Faraday effect Filter, color Fine structure (spectrum lines) Flame photometry. Focal length. Foot-candle Foot-lambert Franck Condon principle. Frequency (wave motion). Fringe (optics) Ghost image optical. Gray. Ground state. Gun sights. Huygens' principle Illuminance Image, optical. Inertia of energy Interference filter, optical Interference of waves Interferometry. Isotope shift. Kerr effect Lambert. Lantern slides. Latent image. Lens, optical Light. Light amplifier Light panel. Line spectrum. Lumen. Lumen hour. Luminance. Luminescence Luminosity factor. Luminous efficienc [illegible]

in [illegible]

M [illegible]

[illegible] Mirage Mirror optics. Molecular structure and spectra. Observatory, astronomical Opaque medium. Opera glasses Optical fibers. Optical flat. Optical materials. Optical methods of chemical analysis. Optical recording. Optical tracking instruments Optics. Optics, geometrical. Optics, physical Paschen-Back effect Penumbra Periscope Phosphorescence. Phot. Photon. Photoelasticity Photoelectric devices Photoelectricity. Photography. Photography, color. Photoluminescence. Photometer Photometry Planck's constant. Pleochroism Point source. Polarimetric analysis. Polarized light Prism, optical Projection systems, optical Projector (light). Pyrometer. Quantitative chemical analysis Quantum mechanics. Quantum physics. Radiation. Rainbow. Raman effect Range-finder, optical Reflection (electromagnetic radiation) [illegible]

Re [illegible]

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netic radiation). Schlieren photography. Schmidt camera. Shadow. Shadowgraph of fluid flow. Sine wave. Spectrochemical analysis. Spectrography. Spectrophotometric analysis. Spectroscopy. Spectrum. Spherical and aspheric surfaces (optical). Stereoscopy. Stroboscopic photography. Sundog. Telephoto lens. Telescope. Telescope, astronomical. Thermoluminescence. Translucent medium. Transparent medium. Trichroism. Ultraviolet radiation. Umbra. Vectograph. Vision. Wave (physics). Wave equation. Wave motion. Wave optics. Wavelength. White. X-ray optics. Zeeman effect. Zoom lens.

For articles on electromagnetic radiation in general *see* ELECTROMAGNETIC RADIATION. For articles on photoelectric effects and devices *see* SOLID-STATE PHYSICS.

Organic chemistry

Acetaldehyde Acetic acid Acetone. Acetophenone. Acetyl phosphate. Acetylcholine Acetylene. Acid anhydride. Acid halide. Acridine. Acrolein. Acrylonitrile. Acylation. Addition polymerization. Addition reaction. Adenosinediphosphate (ADP). Adenosinetriphosphate (ATP). Adenylic acid Adhesive. Adiponitrile. Adrenal cortex steroid. Adrenal gland. Alanine. Albumin. Alcohol. Aldehyde. Aldosterone. Alicyclic hydrocarbon. Aliphatic hydrocarbon Alkaloid Alkane Alkanolamine. Alkene. Alkyl radical. Alkyne. Almond. Amide, acid. Amine Amino acids Amino resins. para-Aminobenzoic acid. para-Aminophenol. Amylase Androgen Aniline. Anise. Anthocyanin. Anthracene Anthranilic acid. Anthraquinone pigments. Antibacterial agents. Antiseptic. Arginine Aromatic hydrocarbon. Ascorbic acid. Asparagine. Aspartic acid Aspirin Asymmetric synthesis Atropine. Auxin. Axole. Belladonna. Benzaldehyde. Benzene. Benzidine. Benzoic acid. Benzophenone. Benzyme. Bile acid. Bilirubin Biochemistry. Biotin Biphenyl. Blood 1,3-Butadiene 2,3-Butanediol. Butane. Butanol. Caffeine. Camphor. Camphor tree Carbanion. Carbazole. Carbohydrate. Carbon tetrachloride. Carbonium ion. Carboxylic acid Carotenoid. Catechol. Cell protoplast. Cellobiose Cellophane. Cellulose. Cellulose derivatives Cetane Cetane number. Cetyl alcohol. Chelation Chemical warfare. Chitin Chloramine-T. Chlorophyll. Cholesterol. Choline. Chromophore. Clinical pathology Cocaine Coenzyme Condensation polymerization Condensation reaction. Conformational analysis Creatine-creatinine Creosote. Cresol Cyclododecatriene. Cyclooctatetraene. Cyclopentadiene. Cysteine. Cystine Cytochrome. Demethylchlortetracycline. Dextran. Dextrin Diastereoisomer. Diazine Diazotization. Diels-Alder reaction. Diene. Digitoxigenin. Dioxane. Diphenylmethane. Diphosphopyridine nucleotide (DPN). Disulfide Drying oil Dye. Electrophilic and nucleophilic reagent. Enantiomorph. Enzyme Epinephrine. Epoxidation. Epoxy resin. Epoxysuccinic acid Ergosterol Essential oils Ester. Estrogen. Ethane. Ether. Ethyl acetate Ethyl acetoacetate. Ethyl malonate. Ethylene chlorohydrin. Ethylene glycol. Ethylene oxide. Ethylenediaminetetraacetic acid. Eucalyptus. Fat and oil, nonedible. Fibrinogen. Flavone. Folic acid. Formaldehyde. Formic acid. Freon Friedel-Crafts reaction. Fructose. Fumaric acid. Furan. Furfural Galactose. Gallic acid. Gamma globulin. Globulin. Gluconic acid. Glucose. Glucose-1-phosphate. Glucose-6-phosphate. Glucoside. Glue. Glutamic acid Glutamine. Glutelin. Glycerol. Glycine. Glycogen Glycol Glycolipid. Glycoside. Gonad. Grignard reaction. Haloform reaction. Halogenated hydrocarbon. Hemicellulose. Hemoglobin. Heterocyclic compounds. Hexamethylenetetramine. Hexaphenylethane. Histidine. Hormone. Hormone, adenohypophyseal. Hormone, adrenal cortex. Hormone, adrenal medullary. Hormone, neurohypophyseal. Hyaluronic acid. Hydrocarbon Hydrocarbon resin. Hydroquinone. Hydroxylation reaction. Imidazole. Indene. Indole. Insulin. Inulin. Iron metabolism. Isocyanate. Isoleucine. Isomerism, molecular. Isoprene. Isoquinoline. Ketene. Ketone. Kolbe hydrocarbon synthesis Krebs cycle. Lactam and lactim Lactase. Lactide and lactone Lactose. Lanolin. Leucine. Levan Linoleum Linseed oil. Lipid. Lipid metabolism. Lysine. Maltase. Maltose. Mannan. Menthol. Mercaptan Methane. Methanol. Methionine. Methyl ethyl ketone Microtechnique. Monosaccharide Morphine Morpholine. Mucilage Naphthalene Naphthol. Naphthylamine. Niacin Nicotine Nitrile. Nitrobenzene Nitrogen excretion. Nitroparaffin Nucleic acid Nucleoprotein. Nutrition. Nylon. Octane Octane number Olefin sulfide Oligosaccharide Optical activity. Organic chemical synthesis Organic chemistry. Organic reaction mechanism Organoarsenic compound Organometallic compound Organophosphorus compound. Organosulfur compound Orthoester Oxalic acid. Oxazole. Oxime. Oxytetracycline Ozonization Pancreas Pantothenic acid Parathyroid gland. Pectin. Pentaerythritol Peppermint Peptide. Pharmaceutical chemistry. Pharmacognosy. Pharmacology. Pharmacy. Phenanthrene Phenol Phenolformaldehyde resin Phenylalanine Phosphatide. Photographic materials Photography. Photoreception Photosynthesis Phthalic acid Phthalimide Picric acid. Pinene. Plant fermentation Plant hormones Plant metabolism Plant physiology. Plant respiration. Plant translocation (organic solutes) Plasmal Polyacrylate resin Polyacrylonitrile resin Polyalkene Polyamide resin Polyester resins Polyether resins Polyethylene glycol Polyfluoroolefin resin Polyhydroxy alcohol Polymer Polymer properties Polymerization Polynuclear hydrocarbon Polyolefin resins Polyoxyethylation of alcohol Polysaccharide Polystyrene resin Polysulfide resins Polyurethane resins Polyvinyl resins Poppy Porphyrin Progesterone Prolamine Proline Propane. Propanol Propylene. Protein Protein fibrous. Protein, globular Pyran Pyrazole Pyridine

Pyrimidine. Pyrrole Quaternary ammonium salts. Quinine. Quinoline Quinone. Racemization. Raffinose Reformatsky reaction Resonance (molecular structure). Resorcinol. Respiratory pigments. Riboflavin Rosin. Saccharin. Schiff base. Serine. Serotonin Serum. *Silicone resins*. Soap and detergent Sphingolipid. Squalene. Stereochemistry. Steric effect (chemical reaction). Steroid Sterol. Strychnine Styrene Substitution reaction. Sucrose Sulfamic acids Sulfanilic acid. Sulfenyl chloride Sulfinic acid. Sulfonamide Sulfone (chemical). Sulfonic acid, Sulfonyl chloride Sulfoxide Tall oil. Tannin. Tartaric acid Tautomerism. Terpene. Testis Tetracycline Tetraethyllead Theobromine. Thiamine. Thiazole. Thio compounds Thioaldehyde and thioketone Thioether Thiophene. Thiourea. Threonine. Thyroid gland. Toluene. Toluidine Transamination. Trichloroacetic acid Triglyceride Triphenylmethane. Triphosphopyridine nucleotide (TPN) [illegible]
[illegible]
vegetable. Wood fiber products Wood preservation Wurtz reaction Wurtz-Fittig reaction Xylene

For theoretical aspects *see* ATOMIC PHYSICS For the biochemical interrelationships and life processes *see* BIOCHEMISTRY For technical applications and *production methods see* CHEMICAL ENGINEERING. For *construction* applications *see* MECHANICAL ENGINEERING For the molecular theory of *see* MOLECULAR PHYSICS For the daily application of organic synthesis *see* PETROLEUM ENGINEERING. For the physical *methods of* determining critical constants *see* PHYSICAL CHEMISTRY.

Paleobotany

Algae fossils [illegible] tales Calam[illegible] toniales Ce[illegible] paleobotany Coenopteridales Coralline algae. Cordaitales Cretaceous Cryptozoon Cycadeoidales Cycadofilicales Devonian Eocene Evolution, organic Fossil seeds and fruits Girvanella. Halimeda Hyeniales Jurassic Lepidodendrales Mesozoic Miocene Mississippian Nematophytales Noeggerathiales Oligocene Ordovician Paleobotany. Paleocene. Paleozoic Palynology Pennsylvanian Permian Petrifaction Petrified forests Plant evolution Pleistocene Pleuromeiales Pliocene Postglacial vegetation and climate Pseudobornales Psilophytales Pteridospermae. Quaternary Recent Silurian Solenopora Speciation Sphenophyllales Tertiary. Triassic.

For phylogenetic considerations *see* EVOLUTION, for classification of the plant kingdom *see* PLANT TAXONOMY

Paleontology

Acanthodii. Aistopoda. Amphibia fossils. Anapsida. Anaspida. Animal evolution. Annelida fossils. Anthracosauria. Anthropology, physical. Anthroposcopy. Antiarchi. Apsidospondyli *Archaeocyatha*. Archaeornithes. Archosauria. Arctolepiformes. Arthrodira. Artiodactyla fossils Astrapotheria. Atremata. Aves (fossil). Batoidea fossils. Brachiopoda. Brachythoraci Bradyodonti. Bryozoa fossils. Cambrian. Carboniferous. Carnivora fossils. Cenozoic. Cephalopoda fossils. Cetacea fossils. Chemical fossils. Chimaerae. Chiroptera fossils. Cladoselachii Coccolithophorida (Coccolithidae). Coelenterata fossils Coelolepida Condylarthra Coniconchia. Conodont. Conularida. Cotylosauria. Cretaceous. Cro-Magnon man. Crocodilia fossils. *Dermoptera* fossils. Desmostylia. Devonian. Dinocerata. Dinornithiformes. Dinosaur. Docodonta. Echinodermata fossils. Edentata fossils. Elasmobranchii fossils. Embolomeri Embrithopoda Eocene. Euryapsida. Eurypterida. Evolution, organic. Fontéchevade man. Foraminifera fossils. Fossil Fossil man Fusulinidae. Gastrolith Gastropoda fossils Graptolithina. Heidelberg man. Hesperornis. Heterostraci. Hybodontoidea. Hyracoidea fossils. *Ichthyopterygia*. Ichthyornis. Ichthyosauria. *Ichthyostegalia Ictidosauria* Index fossil. Insecta fossils. Insectivora fossils Java man [illegible] morpha [illegible] origin [illegible] fossils [illegible] sauria. Mesozoic. Micropaleontology Microsauria. *Miocene* Mississippian Monoplacophora Monotremata fossils Multituberculata. Myodocopa Neanderthal man Nectridia. *Neotremata*. Notoungulata Nummulites Oligocene. *Ordovician* Ornithischia Osteichthyes (fossil) Osteostraci. Ostracoda. Ostracoderm Palaeospondyloidea. Palaeotremata Paleocene. Paleoecology. Paleoecology (geochemical aspects) Paleontology Paleozoic Pantodonta Pantotheria Peking man. Pelecypoda fossils Pelycosauria *Pennsylvanian*. Perissodactyla fossils. Permian. Pholidota fossils Piltdown man Placodermi Pleistocene. Pleuracanthodii Pliocene Porifera fossils. Primates (fossil) Proboscidea fossils Protista Protorosauria Protremata. Pterosauria. Pyrotheria Quaternary Recent. Reptilia fossils Rhachitomi. Rhodesian man Rodentia fossils. Rugosa Saurischia. [illegible] [illegible] Stegoselachii Steinheim *man* Stereospondyli. Stromatoporoidea Swanscombe man Symmetrodonta Synapsida Tabulata. *Taeniodonta*. Telotremata. *Temnospondyli Ternifine man*. Tertiary. Thecodontia Therapsida Tillodontia. Tintinnina. Trematosauria *Triassic* Triconodonta Tubulidentata fossils. Xenungulata

For phylogenetic aspects *see* EVOLUTION; for

netic radiation). Schlieren photography. Schmidt camera. Shadow. Shadowgraph of fluid flow. Sine wave. Spectrochemical analysis. Spectrography. Spectrophotometric analysis. *Spectroscopy. Spectrum.* Spherical and aspheric surfaces (optical). Stereoscopy. Stroboscopic photography. Sundog. *Telephoto lens. Telescope. Telescope, astronomical.* Thermoluminescence. Translucent medium. Transparent medium. Trichroism. Ultraviolet radiation. Umbra. Vectograph. Vision. Wave (physics). Wave equation. Wave motion. Wave optics Wavelength. White. X-ray optics. Zeeman effect. Zoom lens.

For articles on electromagnetic radiation in general *see* ELECTROMAGNETIC RADIATION. For articles on photoelectric effects and devices *see* SOLID-STATE PHYSICS.

Organic chemistry

Acetaldehyde. Acetic acid. Acetone. Acetophenone. *Acetyl phosphate. Acetylcholine. Acetylene. Acid* anhydride. Acid halide. Acridine. Acrolein. Acrylonitrile. Acylation. Addition polymerization. Addition reaction. *Adenosinediphosphate (ADP).* Adenosinetriphosphate (ATP). Adenylic acid Adhesive. Adiponitrile Adrenal cortex steroid. Adrenal gland. Alanine. Albumin Alcohol. Aldehyde Aldosterone Alicyclic hydrocarbon. Aliphatic hydrocarbon. Alkaloid Alkane. Alkanolamine Alkene. Alkyl radical Alkyne. Almond. Amide. acid Amine. Amino acids Amino resins. para-Aminobenzoic acid. para-Aminophenol. Amylase Androgen. Aniline. Anise Anthocyanin. Anthracene Anthranilic acid. Anthraquinone pigments *Antibacterial agents. Antiseptic. Arginine Aromatic* hydrocarbon Ascorbic acid. Asparagine Aspartic acid. Aspirin. Asymmetric synthesis Atropine. *Auxin. Axole. Belladonna. Benzaldehyde. Benzene* Benzidine. Benzoic acid Benzophenone Benzyme Bile acid Bilirubin Biochemistry. Biotin Biphenyl. *Blood. 1,3-Butadiene. 2,3-Butanediol. Bu*tane. Butanol Caffeine. Camphor. Camphor tree. Carbanion. Carbazole. Carbohydrate. Carbon tetrachloride. Carbonium ion. *Carboxylic acid* Carotenoid. Catechol. Cell protoplast. Cellobiose Cellophane. Cellulose. Cellulose derivatives Cetane Cetane number. Cetyl alcohol Chelation Chemical warfare. Chitin. Chloramine-T Chlorophyll. Cholesterol. Choline Chromophore Clinical pathology Cocaine Coenzyme. Condensation polymerization Condensation reaction. Conformational analysis Creatine-creatinine. Creosote Cresol Cyclododecatriene Cyclooctatetraene. Cyclopentadiene Cysteine. Cystine. Cytochrome. Demethylchlortetracycline. *Dextran. Dextrin.* Diastereoisomer Diazine. Diazotization. Diels-Alder reaction. Diene. Digitoxigenin. Dioxane. Diphenylmethane. Diphosphopyridine nucleotide (DPN). Disulfide. Drying oil. Dye. Electrophilic and nucleophilic reagent Enantiomorph. Enzyme. Epinephrine. Epoxidation Epoxy resin. *Epoxysuccinic acid. Ergosterol.* Essential oils. Ester. Estrogen. Ethane. Ether. Ethyl acetate. Ethyl acetoacetate. Ethyl malonate. Ethylene chlorohydrin. Ethylene glycol. Ethylene oxide. *Ethylenediaminetetraacetic acid. Eucalyptus. Fat* and oil, nonedible. Fibrinogen. Flavone. Folic acid. Formaldehyde. Formic acid. Freon. Friedel-Crafts reaction. Fructose. Fumaric acid. Furan Furfural Galactose. Gallic acid. Gamma globulin. Globulin Gluconic acid. Glucose. Glucose-1-phosphate. Glucose-6-phosphate. Glucoside. Glue. *Glutamic acid.* Glutamine. Glutelin. Glycerol. Glycine. Glycogen. Glycol. Glycolipid. Glycoside. Gonad. Grignard reaction. Haloform reaction. Halogenated hydrocarbon. Hemicellulose Hemoglobin. Heterocyclic compounds *Hexamethylenetetramine. Hexaphenyl*ethane. Histidine. Hormone. Hormone, adenohypophyseal. Hormone, adrenal cortex. Hormone, *adrenal medullary. Hormone, neurohypophyseal* Hyaluronic acid Hydrocarbon Hydrocarbon resin. Hydroquinone Hydroxylation reaction. Imidazole *Indene. Indole.* Insulin. Inulin. Iron metabolism. Isocyanate. Isoleucine Isomerism, molecular. Isoprene. Isoquinoline. Ketene Ketone. Kolbe hydrocarbon synthesis Krebs cycle. Lactam and lactim Lactase. Lactide and lactone Lactose. Lanolin Leucine Levan. Linoleum. Linseed oil. Lipid. Lipid metabolism. Lysine Maltase. Maltose. Mannan. Menthol. Mercaptan. Methane. Methanol Methionine. Methyl ethyl ketone Microtechnique Monosaccharide. Morphine Morpholine. Mucilage. Naphthalene. Naphthol Naphthylamine. Niacin. Nicotine. Nitrile Nitrobenzene. Nitrogen excretion Nitroparaffin. Nucleic acid Nucleoprotein. Nutrition Nylon. Octane Octane number. Olefin sulfide. *Oligosaccharide. Optical activity Organic chemical* synthesis. Organic chemistry. Organic reaction mechanism Organoarsenic compound. Organometallic *compound Organophosphorus compound.* Organosulfur compound Orthoester Oxalic acid Oxazole Oxime Oxytetracycline Ozonization. Pancreas *Pantothenic acid Parathyroid gland* Pectin Pentaerythritol. Peppermint Peptide Pharmaceutical chemistry Pharmacognosy Pharmacology *Pharmacy Phenanthrene Phenol Phenolformalde*hyde resin Phenylalanine. Phosphatide Photographic materials Photography Photoreception Photosynthesis *Phthalic acid Phthalimide.* Picric acid. Pinene. Plant fermentation Plant hormones Plant metabolism. Plant physiology Plant respiration. Plant translocation (organic solutes). Plasmal Polyacrylate resin Polyacrylonitrile resin Polyalkene Polyamide resin Polyester resins Polyether resins Polyethylene glycol Polyfluoroolefin resin Polyhydroxy alcohol Polymer Polymer properties Polymerization Polynuclear hydrocarbon Polyolefin resins Polyoxyethylation of alcohol Polysaccharide Polystyrene resin Polysulfide resins Polyurethane resins Polyvinyl resins Poppy Porphyrin Progesterone Prolamine Proline Propane. Propanol Propylene Protein Protein fibrous. Protein, globular Pyran Pyrazole Pyridine

Physical chemistry

For the theoretical aspects of the atom and the nucleus *see* ATOMIC PHYSICS. For the life sciences applications *see* BIOCHEMISTRY. For the visible and invisible wave applications *see* ELECTROMAGNETIC RADIATION. For the solid state relationships *see* SOLID-STATE PHYSICS, THEORETICAL PHYSICS

Physical geography

living groups of animals *see* INVERTEBRATE ZOOLOGY; VERTEBRATE ZOOLOGY.

Parasitology

Acanthocephala. Acnidosporidea Actinomyxidia. Adeleida Ameba. Amebiasis. Amphilinidea. Anoplura. Aphelenchoidea. Aporidea. Archiacanthocephala. Arhynchobdellae. Ascariasis. Ascaridida. Ascaridina. Ascaris. Aspidogastrea. Axonolaimoidea. Balantidiasis. Bedbug. Branchiura. Calanoida Caligoida. Cephalobaenida. Cercaria. Cestoda. Cestodaria. Cestoidea. Chagas' disease. Chemotherapy Chigger. Chromadoroidea. Cirripedia Cladocopa Clonorchiasis. Cnidosporidia. Coccidia. Coenurosis. Copepoda. Cyclophyllidea. Cyclopoida. Cysticercosis. Desmodoroidea. Dicyemida. Digenea. Dioctophymoidea. Diphyllidea. Dorylaimoidea. Dracunculoidea. Echinococcosis Eimeriida. Eocanthocephala. Epicaridea. Eucestoda. Eugregarinida Fascioliasis. Fasciolopsiasis. Filariasis. Filarioidea. Flea. Gregarinidia. Guinea worm infection. Gyrocotylidea. Haemosporidiida. Haplosporidia. Helicosporidia. Heterophyiasis. Hirudinea. Hookworm Hookworm disease Hyperiidea Ixodides Lecanicephaloidea. Leech. Leishmaniasis Lernaeopodoida. Louse. Mallophaga Mermithoidea Mesostigmata. Mesozoa. Microsporidia Mite Monhysteroidea. Monogenea. Moruloidea. Myiasis. Myodocopa. Myxosporidia. Nematoda. Nippotaeniidea. Onychopalpida. Orthonectida Oxyurina. Oxyuroidea Palaeacanthocephala. Paragonimiasis. Parasitic castration. Parasitology. Parasitology, medical Pentastomida Pinworm Pinworm infection Platyhelminthes. Plectoidea. Pneumocystosis. Porocephalida. Proteocephaloidea. Proteomyxida. Pseudophyllidea Rhabdiasoidea. Rhabditoidea Rhizocephala Rhynchobdellae. Sarcoptiformes Sarcosporidia. Schizogregarinida. Siphonaptera. Sparganosis Spiruroidea. Sporozoa Strongyloidea Strongyloidiasis. Tapeworm. Tapeworm disease. Telosporidea Tetraphyllidea. Tick Toxoplasmosis. Trematoda Trichinosis. Trichomoniasis Trichuroidea. Trombidiformes. Trypanorhyncha Trypanosomatidae. Tylenchoidea. Whipworm disease.

Pathology

See ANIMAL PATHOLOGY; MEDICAL MICROBIOLOGY; MYCOLOGY; PARASITOLOGY; PLANT PATHOLOGY, PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL, VIROLOGY.

Petroleum chemistry

Aircraft fuel. Alkylation Analytical chemistry. Antifreeze mixture. Antiknock agents. Aromatization. Carbon black. Coking (petroleum refining) Cracking. Depolymerization. Dewaxing (petroleum). Diesel fuel. Distillate fuel. Flash point Fractionating column Fuel oil. Gas field and gas well. Gasoline. Isomerization. Jet fuel. Kerosine. Liquefied petroleum gas (LPG). Lubricant. Lubrication, engine Naphtha. Oil analysis. Oil and gas field development. Oil and gas storage. Oil and gas wells. Petrochemical. Petrolatum. Petroleum engineering Petroleum processing. Petroleum products. Pour point. Reforming (petroleum refining). Sampling techniques. Textile chemistry. Tube-still heater Wax, petroleum.

For design methods and unit operations *see* CHEMICAL ENGINEERING; for relationships with earth sciences *see* GEOCHEMISTRY; for the components of production *see* MECHANICAL ENGINEERING; for methods used in petroleum synthesis *see* ORGANIC CHEMISTRY

Petroleum engineering

Cable-tool drill. Centrifugal pump. Displacement pump. Gas field and gas well. Geophysical prospecting. Oil and gas field development. Oil and gas field exploitation. Oil and gas storage. Oil and gas well drilling Oil and gas wells. Oil mining Oil-field model Petroleum engineering. Petroleum geology. Petroleum reservoir engineering Petroleum secondary recovery. Photoclinometer. Prospecting, petroleum. Pump. Pumping machinery. Rotary tool drill Turbodrill.

See also MINING ENGINEERING; PETROLEUM CHEMISTRY.

Petrology

For articles pertaining to rocks and minerals *see* GEOLOGY (MINERALOGY AND PETROLOGY); for additional treatment of related geochemical processes *see* GEOCHEMISTRY.

Photography

Aberration, optical. Acetic acid. para-Aminophenol Astronomical photography Bleaching. Buffer solution Camera. Camphor Candle Candlepower. Catechol Cellulose derivatives. Chelation. Chemical engineering Chemical microscopy Chemical process control. Cinematography. Colorimetry Colloid. Crystallization Desiccant Distillation, molecular Drying Dye Dyeing Equilibrium chemical Estrification. Ethylenediaminetetraacetic acid Exposure meter Filter color Focal length Foot-candle. Foot-lambert. Free radical. Gel Glycerol Hydroquinone Image, optical Indicator, acid-base Inhibitor, chemical Ion Lantern slides Latent image. Lens, optical Lumen Melting point Metallography Microfilming Microradiography. Neutralization Optical tracking instruments Organic chemistry Paper and paper products Phot. Photochemistry Photoflash lamp Photographic materials Photography. Photography color Photolysis (photochemistry) Photometer Photometry Physical chemistry Pigment Polymer Polymer properties Projection systems, optical. Radiography Rangefinder, optical Saturation of solutions Schlieren photography Schmidt camera Shadowgraph of fluid flow. Solution. Sound track Stroboscopic photography. Spectrography. Surface coating. Telephoto lens Telephotography Thickening

yrinthulales Lactobacillaceae. Larch. Legume. Leitneriales. Lemon Lepidodendrales. Leptospira. Leptostromataceae. Lespedeza. Lettuce. Lichens. Licorice. Lignumvitae. Liliales. Lime (botanical). Linden Locust (forestry). Lupine. Lychee. Lyco-

berry Musci. Mushroom. Muskmelon. Mustard. Mycelia Sterilia. Mycobacteriaceae. Mycoplasmatales Myriangiales. Myricales. Myrtales. Myxobacterales. Myxomycetes. Nectarine Neisseriaceae. Nematophytales Nitrobacteriaceae. Noeggerathiales Nutmeg Oak Oats Okra. Olive Onion. Oph-

(black). Peppermint Phaeophyta. Phycomycetes. Pine

plar

mor

Pom

pionibacteriaceae. Proteales. Proteus. Protophyta

sidotales. Pteridospermae Pteropsida. Pyrethrum. Pyrrophyta. Quebracho Quince Quinoa Radish Ramie. Ranales. Rape Raspberry. Rauwolfia. Red alder Redtop grass. Redwood. *Rhamnales. Rhizobiaceae* Rhodobacterineae. Rhodophyta. Rhubarb Rosales Rose Rubber tree Rubiales Rutabaga

Shigella Siderocapsaceae Sisal. Soutwood Soybean. Spearmint Sphaerioidaceae Sphaeropsidales Sphenophyllales Sphenopsida Spirillaceae Spirochaetales. Sporobolomycetales. Spruce. Staphylococcus. Stilbellaceae. Strawberry Streptococcus. Streptomycetaceae Strophanthus

gum Sy

rine Tea

Tobacco Tracheophyta Tuberculariaceae Tubiflorales Tulip tree. Tung tree Tupelo Turmeric Turnip Umbellales Uredinales Urticales. Ustilaginales Vanilla. Varnish tree. Venus' flytrap. Vetch Virales Walnut. *Wheat.* Willow. Yeast Zythiaceae.

For the economic and practical aspects of these groups see AGRICULTURE. For the use of certain plants related to the control of soil *erosion*, water and land range management *see* CONSERVATION. For structure *see* PLANT ANATOMY. For environmental considerations of many of these groups *see* PLANT ECOLOGY For diseases *see* PLANT PATHOLOGY. For functional aspects *see* PLANT PHYSIOLOGY.

Plant pathology

Abaca. Alfalfa. Apricot. Ascomycetes. Bacteria. Barley. Basidiomycetes. Bean. Cabbage. Cacao. Cherry. Clover Coconut. Coffee. Corn. Cotton. Cowpea. Cucumber Currant. Eumycetes. Flax. Fruit (tree) diseases. Fungi Imperfecti. Grass crops. Jute. Lettuce. Melon growing. Millet. Oats. Onion. Ornamental plant. Pea. Peach. Peanut. Phycomycetes. Plant disease. Plant disease control. Plant virus. Plum Potato, Irish. Potato, sweet. Ramie. Raspberry. Rhizosphere. Rice. Rust (microbiology). Sisal Smut (microbiology) Soil microbiology. Soil sterilization. *Sorghum.* Soybean. Squash. Strawberry. Sugar beet. Sugar cane. Sunflower. Tobacco. Tree Turnip. Wheat. Wood decay. Yeast.

For other articles on the effects of plant disease *see* AGRICULTURE. For articles on the effect of plant disease on the animal and plant communities *see* ANIMAL ECOLOGY, PLANT ECOLOGY. For more articles on techniques in studying plant disease *see* MICROBIOLOGY

Plant physiology

Acetyl phosphate. Adenosinediphosphate (ADP). Adenosinetriphosphate (ATP) *Adenylic acid.* Alanine Amino acids Amylase. *Arginine.* Ascorbic acid Asparagine

oxidati

tabolis

tine-cre

trin D

(DPN)

Folic acid. Fructose. Galactose. Glucose Glucose-1-phosphate Glycose-6-phosphate. Glutamic acid Glutamine Glutelin. Glycine Glycolipid Hydroponics Inositol Inulin Isoleucine. Krebs *cycle.* Lactase Leucine Lipid Lipid metabolism Lysine. *Metabolism* Methionine Monosaccharide Niacin. *Nucleic acid* Nucleoprotein. Oligosaccharide Pantothenic acid. Peptide Phenylalanine. Phosphatide Photochemistry Photoperiodism in plants. Photosynthesis. Plant, mineral nutrition *of. Plant,* minerals essential to Plant. water relations *of.* Plant fermentation Plant growth. Plant hormones. Plant metabolism

ogy. Plant

solutes).

Proline.

Riboflavin

Sucrose Thiamine Threonine. Transamination Triglyceride Triphosphopyridine nucleotide (TPN). *Tryptophan* Tyrosine. Valine Vitamin.

For applications in farming *see* AGRICULTURE; for applications in tree and lumber management *see* FORESTRY; for applications in various plant tissues *see* PLANT ANATOMY, for applications in the study of plant relations to each other and the environment *see* PLANT ECOLOGY.

meteorology. Polygonal ground. Prairie. Precession of Equinoxes. Range land conservation. River. Sirocco. Snow line. Soil (great soil groups). Soil, zonal distribution. Soil conservation. Solstice. *South America. South Pole. Stadia. Steppe.* Surveying. Terrain areas, world-wide. Theodolite. Time. Topographic surveying and mapping. Tropic of Cancer. Tropic of Capricorn. Tundra. Vegetation zones (world). Water conservation. Weather map. *West Indies.*

For biogeography articles *see* ANIMAL ECOLOGY; PLANT ECOLOGY. For articles on the origin of land forms and major earth forms, *see* GEOLOGY (SURFICIAL AND HISTORICAL). For related articles on the earth and its atmosphere *see* GEOPHYSICS; METEOROLOGY AND CLIMATOLOGY. For articles on the oceans and seas *see* OCEANOGRAPHY.

Physics

See ACOUSTICS; ATOMIC PHYSICS; CLASSICAL MECHANICS; ELECTRICITY AND ELECTROMAGNETISM; ELECTROMAGNETIC RADIATION; FLUID MECHANICS; HEAT; MOLECULAR PHYSICS; OPTICS; NUCLEAR PHYSICS; SOLID-STATE PHYSICS; THEORETICAL PHYSICS; THERMODYNAMICS.

Physiology

See BIOCHEMISTRY; BIOPHYSICS; COMPARATIVE PHYSIOLOGY; *GENERAL PHYSIOLOGY; MICROBIOLOGY*; PLANT PHYSIOLOGY; PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL.

Plant anatomy

Bark. *Bud* (botany). Budding. Collenchyma. Cortex, plant. Endodermis. Epidermis, plant. Flower (botany). Fruit (botany). Grafting of plants. Hypodermis. Leaf (botany). Meristem, apical. Meristem, lateral. Parenchyma. Pericycle. Periderm. Phloem. Pith. Plant anatomy. Plant morphogenesis. Plant organs. Plant tissue systems. Root (botany). Sclerenchyma. Secretory structures, plant. Seed (botany). Stele. Stem (botany). Stem cuttings. Vascular bundles. Wood (anatomy and identification). Xylem.

For certain economic aspects *see* AGRICULTURE; FORESTRY; for environmental and functional aspects of plants *see* PLANT ECOLOGY; PLANT PHYSIOLOGY; for classification of plants *see* PLANT TAXONOMY.

Plant ecology

Biome. Biotic isolation. Climax community. Climax plant formations. Community. Dune. Ecologic interactions. *Ecology. Ecology, applied. Ecology,* physiological. Ecosystem. Environment. Forest vegetation. Fresh water ecosystem. Island faunas and floras. Mangrove swamp. Marine marsh. Merriam's life zones. Oasis. Plant community. Plant geography. Plant *societies. Population dispersal.* Population dispersion. Species population. Steppe. Terrestrial ecosystem. Territoriality. Tundra. Vegetation zones. Vegetation zones (world). Zoogeographic region.

For economic aspects *see* AGRICULTURE; for *certain biotic factors see* ANIMAL ECOLOGY; for marine environments *see* OCEANOGRAPHY; for physical factors of the environment *see* PHYSICAL GEOGRAPHY. For structure and function of plants and plant tissues *see* PLANT ANATOMY; PLANT PHYSIOLOGY.

Plant kingdom

Abaca. Acrasiales. Actinomycetaceae. Actinomycetales. Actinoplanaceae. Aerobacter. Alfalfa. Algae. Algae fossils. Allspice. Almond. Angiospermae. Anise. Anthocerotae. Apple. Apricot. Arales. Arborvitae. Archaeopteris. Archichlamydeae. Aristolochiales. Artichoke. Ascomycetes. Ash. Asparagus. Avocado Azotobacteraceae. Bacillaceae. Bacteroidaceae. Balanopsidales. Balsa. Bamboo. Banana. Barley. Basidiomycetes. Basswood. Bean. Beech. Beet. Beggiatoales. Belladonna. Bennettitales Bermuda grass. Betel nut. Birch. Blackberry Blueberry. Bluegrass. Bluestem grass. Breadfruit. Brevibacteriaceae. Broccoli. Brome grass. Brucellaceae. Brussels sprouts. Bryophyta. Buckeye. Buckwheat. Cabbage. Cacao. Cactus. Calamitales. Campanulales. Camphor-tree. Cantaloupe. Caraway. Cardamon. Carrot. Caryophanales. Cashew. Cassava. Castor bean. Casuarinales. Cauliflower. Caulobacteraceae. Caytoniales. Cedar. Celery. Centrospermales. Charophyta. Cherry. Cherry, wild black. Chestnut. Chicory. Chlamydobacteriales. Chlorophyta. Cholera vibrio. Chrysophyta. Cinchona. Cinnamon Citron Citronella. *Clove. Clover. Coca. Coconut. Coenopteridales.* Coffee. Cola. Colchicine. Collard. Coniferales. Coniferophytae. Cordaitales. Coriander Corn. Cotton. Cowpea. Crabapple. Cranberry. Cress. Cryptococcales. Cubeb Cucumber. Cumin. Currant. Curry. Cyanophyta. Cycadales. Cycadeoidales. Cycadofilicales. Cycadophytae. Cypress. Dallis grass Dasheen Date. Dematiaceae. Derris. Diatom Dicotyledoneae. Digitalis. Dill. Discellaceae. Douglas-fir. Ebenales. Ebony Eggplant. Elm Embryophyta English walnut. Enterobacteriaceae. Ephedra. Equisetales. Equisetineae. Ericales. Erysiphales. Escherichia Eubacteriales. Eucalyptus. Euglenophyta. Eumycetes. Eurotiaceae. Eurotiales. Fagales. Farinales. *Fennel* Fescue. *Fig. Filbert. Filicales. Filicineae.* Fir. Flax. Fungi. Fungi Imperfecti. Gaffkya tetragena. Garlic. Gentianales. Geraniales. Ginger. Ginkgoales. Ginseng. Gnetales. Gooseberry. Graminales. Grapefruit. Guava. Guayule. Gymnospermae. *Hackberry. Helobiales. Hemlock. Hemp.* Hepatic[illegible] [illegible] Hickory. Holly. [illegible] Hop. H[illegible] [illegible]niales. Hyphomicrobiales. Ipecac. Isoetales. Juglandales. *Jute.* Kale. Kapok tree. Kentucky coffee-tree. Klebsiella pneumoniae. Kohlrabi. Kudzu. Lab-

ynthulales Lactobacillaceae Larch. Legume Leitneriales. Lemon Lepidodendrales. Leptospira Leptostromataceae Lespedeza. Lettuce. Lichens. Licorice. Lignumvitae. Liliales. Lime (botanical). Linen Locust (forestry). Lupine Lychee. Lycopodiales. Lycopodineae. Lycopsida Magnolia. Ma-

berry. Musci. Mushroom. Muskmelon. Mustard. Mycelia Sterilia Mycobacteriaceae. Mycoplasmatales Myrtangiales Myricales. Myrtales. Myxobacterales Myxomycetes. Nectarine. Neisseriaceae Nematophytales. Nitrobacteriaceae. Noeggerathiales Nutmeg. Oak. Oats. Okra Olive. Onion. Ophioglossales. Opuntiales. Orange. Orchid. Orchidales. Osage-orange Palm Palmales. Pandanales Papaverales Paprika Parietales. Parsley Parsnip. Pea. Peach Peanut. Pear Pecan Pepper Pepper (black). Peppermint. Phaeophyta Phycomycetes. Piña. Pine. Pineapple Piperales. Pistachio Pitcher plant. Plantaginales. Pleuromeiales. Plum. Pneumococcus Poison ivy Poison sumac Polygonales. Pomegranate. Poplar. Poppy. Primulales. Propionibacteriaceae Proteales Proteus Protophyta Pseudoborniales. Pseudomonadaceae Pseudomonadales. Pseudomonadineae Pseudomonas aeruginosa Psilophytales Psilophytineae Psilopsida. Psilotales. Pteridospermae. Pteropsida Pyrethrum. Pyrrophyta Quebracho Quince. Quinoa Radish Ramie Ranales Rape. Raspberry. Rauwolfia. Red alder

Rosa

Rye Safflower. Saffron Sage. Salicales. Salmonella Sandalwood. Santalales Sapindales Sarraceniales Sarsaparilla. Sassafras Schizomycetes Schizophyceae Scitaminales Selaginellales Sequoia. Shigella. Siderocapsaceae Sisal Sourwood Soybean Spearmint. Sphaerioidaceae. Sphaeropsidales. Sphenophyllales. Sphenopsida Spirillaceae Spirochaetales Sporobolomycetales Spruce Staphylococcus Stilbellaceae. Strawberry Streptococcus Streptomycetaceae. Stophanthus Strychnos Sundew Sunflower Sweetgum Sycamore Sympetalae Synanthales. Tangerine. Tea Thallophyta Thiobacteriaceae. Timothy Tobacco Tomato Tracheophyta Tuberculariaceae Tubiflorales Tulip tree Tung tree. Tupelo Turmeric. Turnip Umbellales Uredinales Urticales. Ustilaginales Vanilla Varnish tree. Venus' flytrap. Vetch Virales Walnut Wheat. Willow. Yeast. Zythiaceae

For the economic and practical aspects of these groups see AGRICULTURE For the use of certain plants related to the control of soil erosion, water and land range management see CONSERVATION. For structure see PLANT ANATOMY For environmental considerations of many of these groups see PLANT ECOLOGY For diseases see PLANT PATHOLOGY. For functional aspects see PLANT PHYSIOLOGY.

Plant pathology

Abaca Alfalfa. Apricot. Ascomycetes. Bacteria. Barley. Basidiomycetes. Bean. Cabbage. Cacao. Cherry. Clover. Coconut. Coffee Corn Cotton. Cowpea. Cucumber. Currant. Eumycetes Flax. Fruit (tree) diseases. Fungi Imperfecti Grass crops. Jute. Lettuce. Melon growing. Millet. Oats. Onion. Ornamental plant Pea. Peach. Peanut. Phycomycetes. Plant disease. Plant disease control. Plant virus. Plum. Potato, Irish. Potato, sweet. Ramie. Raspberry. Rhizosphere. Rice. Rust (microbiology). Sisal. Smut (microbiology). Soil microbiology Soil sterilization. Sorghum. Soybean. Squash. Strawberry Sugar beet Sugar cane. Sunflower. Tobacco. Tree. Turnip. Wheat. Wood decay. Yeast.

For other articles on the effects of plant disease see AGRICULTURE. For articles on the effect of plant disease on the animal and plant communities see ANIMAL ECOLOGY; PLANT ECOLOGY. For more articles on techniques in studying plant disease see MICROBIOLOGY.

Plant physiology

Acetyl phosphate. Adenosinediphosphate (ADP). Adenosinetriphosphate (ATP). Adenylic acid. Alanine Amino acids Amylase. Arginine. Ascorbic acid. Asparagine Aspartic acid. Auxin Biological oxidation. Biotin. Carbohydrate. Carbohydrate metabolism. Carotenoid. Chlorophyll. Coenzyme. Creatine-creatinine Cysteine. Cystine. Cytochrome. Dextrin. Digitoxigenin. Diphosphopyridine nucleotide (DPN). Enzyme Enzyme inhibition. Ergosterol. Folic acid. Fructose Galactose. Glucose Glucose-1-phosphate. Glycose-6-phosphate Glutamic acid. Glutamine Glutelin Glycine Glycolipid. Hydroponics. Inositol Inulin. Isoleucine. Krebs cycle. Lactase Leucine Lipid. Lipid metabolism. Lysine. Metabolism. Methionine Monosaccharide. Niacin Nucleic acid Nucleoprotein Oligosaccharide Pantothenic acid Peptide Phenylalanine Phosphatide. Photochemistry Photoperiodism in plants. Photosynthesis Plant, mineral nutrition of. Plant, minerals essential to Plant, water relations of

Sucrose Thiamine Threonine. Transamination Triglyceride Triphosphopyridine nucleotide (TPN). Tryptophan. Tyrosine Valine Vitamin

For applications in farming see AGRICULTURE; for applications in tree and lumber management see FORESTRY. for applications in various plant tissues see PLANT ANATOMY; for applications in the study of plant relations to each other and the environment see PLANT ECOLOGY

meteorology. Polygonal ground. Prairie. Precession of Equinoxes. Range land conservation. River. Sirocco. Snow line. Soil (great soil groups). Soil, zonal distribution. Soil conservation. Solstice. South America. South Pole. Stadia. Steppe. Surveying. Terrain areas, world-wide. Theodolite. Time. Topographic surveying and mapping. Tropic of Cancer. Tropic of Capricorn. Tundra. Vegetation zones (world). Water conservation Weather map. West Indies.

For biogeography articles *see* ANIMAL ECOLOGY; PLANT ECOLOGY. For articles on the origin of land forms and major earth forms, *see* GEOLOGY (SURFICIAL AND HISTORICAL). For related articles on the earth and its atmosphere *see* GEOPHYSICS; METEOROLOGY AND CLIMATOLOGY. For articles on the oceans and seas *see* OCEANOGRAPHY.

Physics

See ACOUSTICS; ATOMIC PHYSICS; CLASSICAL MECHANICS; ELECTRICITY AND ELECTROMAGNETISM; ELECTROMAGNETIC RADIATION; FLUID MECHANICS; HEAT; MOLECULAR PHYSICS; OPTICS; NUCLEAR PHYSICS; SOLID-STATE PHYSICS; THEORETICAL PHYSICS; THERMODYNAMICS.

Physiology

See BIOCHEMISTRY; BIOPHYSICS; COMPARATIVE PHYSIOLOGY; GENERAL PHYSIOLOGY; MICROBIOLOGY; PLANT PHYSIOLOGY; PSYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL.

Plant anatomy

Bark. Bud (botany). Budding Collenchyma. Cortex, plant. Endodermis. Epidermis, plant. Flower (botany). Fruit (botany). Grafting of plants. Hypodermis Leaf (botany). Meristem, apical Meristem, lateral. Parenchyma. Pericycle. Periderm. Phloem. Pith Plant anatomy. Plant morphogenesis Plant organs. Plant tissue systems Root (botany) Sclerenchyma Secretory structures, plant. Seed (botany) Stele. Stem (botany). Stem cuttings. Vascular bundles. Wood (anatomy and identification) Xylem.

For certain economic aspects *see* AGRICULTURE; FORESTRY; for environmental and functional aspects of plants *see* PLANT ECOLOGY; PLANT PHYSIOLOGY; for classification of plants *see* PLANT TAXONOMY.

Plant ecology

Biome. Biotic isolation. Climax community. Climax plant formations. Community. Dune. Ecologic interactions. Ecology. Ecology, applied. Ecology, physiological Ecosystem. Environment. Forest vegetation. Fresh water ecosystem. Island faunas and floras. Mangrove swamp. Marine marsh. Merriam's life zones. Oasis. Plant community. Plant geography. Plant societies Population dispersal. Population dispersion Species population. Steppe. Terrestrial ecosystem. Territoriality. Tundra. Vegetation zones. Vegetation zones (world). Zoogeographic region.

For economic aspects *see* AGRICULTURE; for certain biotic factors *see* ANIMAL ECOLOGY; for marine environments *see* OCEANOGRAPHY; for physical factors of the environment *see* PHYSICAL GEOGRAPHY. For structure and function of plants and plant tissues *see* PLANT ANATOMY; PLANT PHYSIOLOGY.

Plant kingdom

Abaca. Acrasiales. Actinomycetaceae. Actinomycetales. Actinoplanaceae. Aerobacter. Alfalfa. Algae. Algae fossils. Allspice. Almond. Angiospermae. Anise. Anthocerotae. Apple. Apricot. Arales. Arborvitae. Archaeopteris. Archichlamydeae. *Aristolochiales. Artichoke. Ascomycetes.* Ash. Asparagus Avocado. Azotobacteraceae. Bacillaceae. Bacteroidaceae. Balanopsidales Balsa. Bamboo. Banana. Barley. Basidiomycetes. Basswood. Bean. Beech. Beet Beggiatoales. Belladonna. Bennettitales. Bermuda grass. Betel nut. Birch Blackberry. Blueberry. Bluegrass Bluestem grass. Breadfruit Brevibacteriaceae. Broccoli Brome grass. Brucellaceae. Brussels sprouts Bryophyta. Buckeye. Buckwheat. Cabbage. Cacao Cactus Calamitales. Campanulales. Camphor-tree. Cantaloupe Caraway. Cardamon. Carrot. Caryophanales. Cashew Cassava. Castor bean. Casuarinales. Cauliflower. Caulobacteraceae. Caytoniales. Cedar. Celery. Centrospermales Charophyta. Cherry. Cherry, wild black. Chestnut. Chicory. Chlamydobacteriales Chlorophyta. Cholera vibrio Chrysophyta. Cinchona Cinnamon. Citron Citronella Clove. Clover. Coca Coconut. Coenopteridales Coffee. Cola. Colchicine. Collard. Coniferales. Coniferophytae. Cordaitales. Coriander Corn. Cotton. Cowpea Crabapple. Cranberry. Cress. Cryptococcales. Cubeb Cucumber Cumin Currant. Curry Cyanophyta Cycadales. Cycadeoidales. Cycadofilicales. Cycadophytae. Cypress Dallis grass. Dasheen Date Dematiaceae. Derris. Diatom. Dicotyledoneae. Digitalis. Dill Discellaceae Douglas-fir. Ebenales Ebony Eggplant Elm Embryophyta. English walnut Enterobacteriaceae. Ephedra Equisetales. Equisetineae. Ericales. Erysiphales. Escherichia Eubacteriales Eucalyptus. Euglenophyta. Eumycetes. Eurotiaceae Eurotiales Fagales Farinales Fennel Fescue Fig. Filbert Filicales Filicineae. Fir Flax. Fungi. Fungi Imperfecti Gaffkya tetragena. Garlic. Gentianales Geraniales Ginger Ginkgoales. Ginseng Gnetales Gooseberry. Graminales. Grapefruit. Guava. Guayule. Gymnospermae. Hackberry Helobiales Hemlock Hemp Hepaticae. Heterobasidiomycetidae. Hickory Holly. Homobasidiomycetidae. Honeydew melon Hop Hophornbeam. Hornbeam Horseradish, Hyeniales. Hyphomicrobiales. Ipecac. Isoetales. Juglandales Jute. Kale. Kapok tree Kentucky coffee-tree. Klebsiella pneumoniae. Kohlrabi Kudzu Lab-

Serology

See MEDICAL MICROBIOLOGY.

Soil

Agricultural soil and crop practices Agriculture (drainage) Clay. Clay minerals. Dust storm. Erosion Evapotranspiration Fertilizing. Forest soil Humus Irrigation of crops. Pedology. Plant, water relations of Regolith Soil Soil balance, microbial. Soil conservation Soil mechanics. Soil microbiology. Soil microorganisms Soil mineral (microbial utilization). Soil phosphorus (microbial cycle) Soil sterilization Soil sulphur (microbial cycle) Terracing (agriculture). Weathering processes

For a consideration of parent materials and other factors which influence the development of soils *see* GEOLOGY (MINERALOGY AND PETROLOGY), GEOLOGY (SURFICIAL AND HISTORICAL), HYDROLOGY.

Solid-state physics

Absorption (electromagnetic radiation). Acceptor atom. Adhesion, molecular Adiabatic demagnetization. Alloy. Alloy structures Alnico. Amalgam Amorphous solid Anelasticity Angstrom. Anisotropy (physics) Antiferromagnetism Atomic clock Band theory of solids Barium titanate Bloch theorem Boltzmann constant Boltzmann transport equation Bose-Einstein statistics Brillouin zone Cathodoluminescence. Ceramic technology Cermet Chemical binding Chemiluminescence Cohesion (physics) Color centers Conduction (heat) Conduction band Contact potential difference Contact rectifier. Controlled rectifier Coordination number Cryosar Cryotron Crystal. Crystal defects Crystal growth Crystal optics Crystal structure Crystallization Crystallography. Curie temperature, magnetic Curie-Weiss law. Cyclotron. Dark cur... in solids ...logräphy ... ductivity of metals Electroluminescence. Electron diffraction Electron emission Electronegativity Energy level (quantum mechanics) Esaki tunnel diode. Exciton Exclusion principle. Fermi-Dirac statistics Ferrimagnetic garnets Ferrimagnetism. Ferrite. Ferrite devices Ferroelectrics. Ferromagnetism Fluorescence Franck-Condon principle Free-electron theory of metals Galvanomagnetic effect. Gel Germanium Germanium diode. Grain boundaries (metallurgy) Ground state Gyrator ...

... phases Intermetallic compounds Ionic crystals Iron silicon alloys. Isomorphism (crystallography) Isotropy (physics). Junction diode. Junction transistor Kerr effect Kinetic theory of matter Kronig-Penney model Langevin function Larmor precession. Lattice constant Lattice vibrations Liesegang rings. Light amplifier. Light ... Luminescence. Luminous paint. Madelung constant. Magnetic materials. Magnetic relaxation. Magnetic resonance. Magnetism. Magnetization. Magnetocaloric effect. Magnetoresistance. Magnetostriction Maser. Matthiessen's rule. Mean free path. Meissner effect Metal Metallic-disk rectifier. Molecular electronics. Morphotropism. Mumetal. Neutron diffraction. Paramagnetism. Parametric amplifier. Permalloy Phonon Phosphorescence. Photoconductive cell Photoconductivity. Photodiode. Photoelasticity. Photoelectric devices. Photoelectricity Photoluminescence. Photolysis (photochemistry) Photon. Phototransistor. Photovoltaic cell Photovoltaic effect. Piezoelectric crystal Piezoelectricity Plasticity. Point-contact diode. Point-contact transistor. Polarization of waves. Polymorphism (crystallography). Potential barrier. Potentials (physics) Probability in physics. Pyroelectricity Quantum (physics) Quantum mechanics Quantum statistics. Quantum theory, nonrelativistic Reciprocity, principle of. Refractory. Relaxation time (electrons) Resilience. Resistivity, electrical Resonance experiments. Rheology Rochelle salt. Selenium Semiconductor Semiconductor rectifier Silicon diode. Single crystal. Sintering Solar battery Solid solution. Solid-state chemistry. Solid-state physics Specific heat of solids Stationary state Statistical mechanics. Sublimation. Superconductivity. Surface-barrier transistor Surface phenomenon Susceptibility, magnetic. Temperature. Thermal expansion Thermal stress. Thermoanalysis Thermoluminescence Thermomagnetic effects Titanate Transistor Traps in solids Twinn... ...ess Valence Wiedemann-F... function (ele... diffraction X...

Sound

See ACOUSTICS

Space technology

Aerodynamic center Aerodynamic force Aerodynamic wave drag Aerodynamics Afterburner Aircraft fuel Air-velocity measurement. Aluminum Apogee Astronautical engineering Astronautics Astronomical coordinate systems Astronomical geophysics Astronomy Astrophysics Ballistic missile. Ballistic range Ballistics exterior. Borane Boron fuel Boundary-layer flow Center of gravity. Center of mass Centrifugal force Centripetal force Ceramic technology Chemical fuel Combustion. Cosmic rays Ducted flow Electromagnetic propulsion. Energy sources Escape velocity Explosion and explosive Flight Flight dynamics Flight science. Fuel. Gas dynamics Hydrazine. Hydrogen Hypersonic flight Impulse (mechanics). Interplanetary propulsion Interstellar matter Interstellar space Ion propulsion Jet propulsion. Latitude

Plant taxonomy

Arboretum. Botanical gardens Classification, biological. Herbarium Plant classification. Plant keys. Plant kingdom. Plant names. Plant taxonomic literature. Taxonomy.

For specific plants and plant groups *see* PLANT KINGDOM.

Production engineering

See INDUSTRIAL AND PRODUCTION ENGINEERING.

Propulsion

Aerodynamic wave drag. Afterburner. Aircraft engine. Aircraft engine, reciprocating. Aircraft engine performance Aircraft fuel. Aircraft propulsion. Air-cushion vehicle. Automotive engine. Benzene. Borane. Boron fuel. Butane. Ceramic technology. Cesium. Chemical fuel. Diesel engine Diesel fuel. Distillate fuel. Electromagnetic propulsion Energy sources Engine. Explosion and explosive. Fire Flight. Flight science. Fossil fuel. Fuel. Fuel gas. Fuel gas supplements Gas dynamics Gas turbine. Gasoline. Hydrazine. Hydrocarbon Hydrogen. Hypersonic flight Internal combustion engine. Interplanetary propulsion Ion Ion propulsion. Jet flow. Jet fuel. Jet propulsion. Jet velocity. Kerosine. Liquified petroleum gas (LPG). Locomotive. Marine engine. Metal-base fuel Missile Nozzle. Nuclear aircraft propulsion Nuclear rocket. Octane. Oxidation process. Oxygen Power. Propellant. Propeller, air Propulsion Pulse jet Radiation pressure Refractory. Rocket engine. Rocket-sled testing. Skin friction Solar energy. Solar engine. Sonic barrier Specific fuel consumption. Specific impulse Steam engine Streamline flow. Streamlining. Subsonic flight Superaerodynamics Supercharger Supersonic flight. Thermodynamic principles. Thermodynamic processes Throttled flow. Thrust. Toluène. Turbine. Turbine propulsion. Turbofan. Turbojet. Turboprop Turboram jet.

For drive mechanisms *see* MECHANICAL ENGINEERING

Psychology, physiological and experimental

Abnormal behavior. Adrenal gland Aggression Agnosia Amnesia Aphasia. Apraxia Astereognosis Audiometry. Behavior, ontogeny of Behavior and heredity. Behavioral psychophysics Black Blindness. Body rhythm Chemoreception. Color Color vision Convulsive disorders. Cretinism Cutaneous sensation. Deafness. Defecation Delusion Effector systems. Electroencephalography. Emotion. Endocrine mechanisms. Ephaptic transmission. Epilepsy. Equilibrium, biological Extrasensory perception (ESP). Freudianism. Frustration. Gray. Hallucination. Headache. Hearing. Hibernation Hoarding behavior. Homeostasis Hormone Human engineering. Hunger. Huntington's chorea Hypnosis Hypothermia. Hysteria. Instinctive behavior. Insulin shock. Intelligence. Involutional melancholia. Itch. Kinesthetic sensation. Learning theories. Lie detector. Loudness. Manic depressive psychosis. Mechanoreceptors. Memory. Mental deficiency. Methods study. Migratory behavior. Mongolian idiocy. Motivation. Motor systems Muscular system. Nervous system Neurophysiology. Neurosis. Noise, acoustic. Obsessive compulsive reaction Operator training Ovary. Pain. cutaneous. Pain. deep. Pancreas. Paralysis agitans. Paranoia. Paranoid state Parathyroid gland. Paresis, general Paresthesia. Perception. Periodicity in organisms Personality theory. Phenylpyruvic oligophrenia. Phobic reaction. Phonoreception. Photoreception. Pitch Posture, regulation of. Problem solving (psychology). Psychic energizer Psychoacoustics. Psychoanalysis Psychogalvanic response Psychology, physiological and experimental Psychopharmacologic drugs Psychophysical methods Psychosis Psychosurgery. Psychotherapy. Psychotomimetic drug. Reflex, conditioned Reflex, unconditioned. Reproductive behavior. Reticular formation (brain) Schizophrenia. Senile dementia. Sensation Sense, chemical Sensory learning Sight. Sleep. Smell. Somatization. Somesthesis. Speech. Stereognosis. Stress (psychological). Synaptic transmission Taste Taxis Temperature senses Thermoregulation Thirst Thyroid gland Tickle Tone (music and acoustics). Touch Tranquilizer. Urination Verbal learning. Vision Wage incentives White. Work measurement

For more information on the chemistry of various physiological processes *see* BIOCHEMISTRY; for articles on cellular physiology *see* CYTOLOGY; for aspects related to inheritance of traits *see* GENETICS.

Sanitary engineering

Amebiasis Analytical chemistry Ascariasis. Bacillary dysentery. Cholera vibrio Colorimetric analysis Enteric bacilli Escherichia Extraction Flame photometry. Flocculation Fluorimetric analysis Gas analysis. Gravimetric analysis Imhoff tank IMViC test Infectious disease control. Infectious disease transmission Ion exchange Nephelometric analysis Polarographic analysis Precipitation chemistry. Qualitative chemical analysis Radiometric assay. Refractometric analysis Sampling techniques. Sanitary engineering Schistosomiasis Septic tank. Sewage. Sewage collection systems Sewage disposal Sewage solids Sewage treatment Spot-test analysis. Stoichiometry Titration, amperometric. Titration. conductimetric Titration, potentiometric Typhoid fever. Volumetric analysis Water analysis. Water microbiology Water pollution Water softening. Water treatment Waterborne disease.

See also BACTERIOLOGY; MEDICAL MICROBIOLOGY; MICROBIOLOGY

Cuckoo. Cuculiformes Curlew. Cyclostomata (Chordata). Cypriniformes. Cyprinodontiformes. Dace. Darter. Deer. Dermoptera Diatrymiformes. Dickcissel. Dinornithiformes Diplasiocoela. Dipnoi Dog Dogfish. Dolphin. Donkey Dove. Duck. Eagle Echeneiformes. Edentata. Eel Elasmobranchii Elephant. Elk. Eutheria. Falconiformes. [illegible]

[illegible]

nule Gannet. Gar. Garter snake. Gasterosteiformes. Gaviiformes. Gecko Gila monster Giraffe. Gnathostomata Gnu. Goat. Gobiesociformes. Goldfish. Goose. Gopher. Gorilla Grackle Grebe Green snake Grosbeak. Grouse. Gruiformes Guinea hen. Guinea pig [illegible]
Hawk [illegible]
Hog H[illegible]
[illegible] Ich-
[illegible] Kan-
[illegible] fisher
[illegible] Lagomorpha. Lamprey. Lampridiformes. Lark Lemming Leopard. Lion. Lizard. Llama Loon Lophiiformes Lovebird Lungfish. Lynx Mackerel Magpie. Mammalia. Manatee Marsupialia Martin. Mastacembeliformes Meantes Menhaden. Metatheria. Mink. Minnow Mockingbird. Mole Mongoose Monkey. Monotremata Moose. Mouse Mud puppy Mule Multituberculata Musk ox Muskrat Myctophiformes. Myxiniformes. Neognathae Neornithes Nighthawk. Notacanthiformes. Nutcracker. Nuthatch Ocelot Odontognathae. Opisthocoela Opossum. Orangutan Oriole. Osteichthyes Osteoglossiformes Ostrich Otter Ovenbird Owl Panda Pantotheria. Parrot Partridge. Passeriformes Peacock *Peccary* Pegasiformes Pelecaniformes Pelican Penguin Perch Perciformes Percopsiformes Perissodactyla Petromyzontiformes Pewee. Phalarope. Pheasant. Phoebe Pholidota. Piciformes. Pickerel. Pisces (zoology) Pleuronectiformes Podicipitiformes Polypteriformes. Porcupine. Porpoise Prairie chicken Prairie dog Primates. Proboscidea. Procellariiformes. Procoela Proteales. Prototheria Psittaciformes Ptarmigan Pteraspidomorphi Puffin. Python Quail Rabbit. Raccoon Rail. *Rajiformes* Rat Rattlesnake Ratites Raven Ray Redstart Reindeer. Reptilia Rheiformes Rhinoceros Rhynchocephalia. Road runner Robin Rodentia Sable Saccopharyngiformes Salamander. Salamandroidea Salientia Salmon Sandpiper Sapsucker Sarcopterygii Sculpin Sea horse Sea lion Seal (zoology). Semionotiformes Shad Shark Sheepshead Shiner Shrew. Shrike Sirenia Skink. Skunk. Sloth. Smelt. Snake. Snipe Sparrow Sphenisciformes Squaliformes. Squamata Squid Squirrel. Starling Stickleback. Strigiformes Struthioniformes. Sturgeon. Sucker. Sunfish Swallow. Swan. Swift. Symmetrodonta. Synbranchiformes Taeniodonta. Tanager. Tapir. Tarpon. Tern. Terrapin. Tetraodontiformes. Tetrapoda. Theria. Thrasher. Thrush. Tiger. Tillodontia. Tinamiformes. Titmouse. Toad. Towhee. Trogoniformes. Trout. Tubulidentata. Tuna. Turkey. Turnstone. Turtle. Vertebrata Vireo. Vulture. Walleye. Walrus. Warbler. Water snake. Waxwing. Weasel. Whale. Whippoorwill. Whitefish. Wolf. Wolverine. Woodchuck. Woodcock. Woodpecker. Wren. Yak. Zebra. Zebu Zeiformes.

For classification schemes and methods *see* ANIMAL SYSTEMATICS; for fossil vertebrates *see* PALEONTOLOGY

Virology

Actinophage. Adenovirus. Animal virus. Antibody. Antigen. Antigen-antibody reaction. Antitoxin Arbor viral encephalitides. Avian leukosis. Bacteria, lysogenic. Bacteriophage Bioassay. Cat scratch disease. Chickenpox and shingles Cold, common Coliphage. Complement (serum). Complement fixation test. Conglutination. Coxsackie virus. Culture, embryonated egg Culture, tissue. Disease carrier ECHO virus Encephalitis, equine Enterovirus. Epidemiology Exanthem subitum Fever. German measles Hemadsorption viruses. Herpes simplex. Hypersensitivity. Immunity. Inclusion blennorrhea Inclusion bodies (virus). Infection, lytic Infectious disease control. Infectious disease transmission Infectious mononucleosis. Infective dose 50. Influenza. Keratoconjunctivitis (epidemic) Louping ill Lymphocytic choriomeningitis Lymphogranuloma venereum Lysin. Lytic reaction Measles Meningitis. Microscope, electron. Microscope, fluorescence Microtatobiotes. Molluscum contagiosum. Mouse viral leukemias. Mumps. Myxomatosis, infectious (rabbits) Myxovirus. Neutralization reaction (antibody). Newcastle disease Nucleic acid Papillomatosis, infectious (rabbit). Pathogen (soil) Phlebotomus fever. Plant disease Plant virus. Pneumonitis Poliomyelitis. Psittacosis Public health Rous sarcoma. Salivary gland virus disease Serology Smallpox Soil balance, microbial Soil microbiology. Tick fever. Colorado. Trachoma Tumor viruses Virales Virulence Virus Wart West Nile fever. Yellow fever.

Zoology

See ANIMAL ANATOMY, ANIMAL ECOLOGY; ANIMAL PATHOLOGY, ANIMAL SYSTEMATICS; BIOCHEMISTRY; BIOPHYSICS; COMPARATIVE PHYSIOLOGY; CYTOLOGY; EVOLUTION, GENETICS, GENERAL PHYSIOLOGY; GROWTH AND MORPHOGENESIS; HISTOLOGY, INVERTEBRATE ZOOLOGY, PALEONTOLOGY; PHYCHOLOGY, PHYSIOLOGICAL AND EXPERIMENTAL; VERTEBRATE ZOOLOGY

pad complex. Mach number. Magnesium. Metal-base fuel. Minitrack. Missile. Model theory. Nose cone. Nuclear aircraft propulsion. Nuclear rocket. Optical tracking. Orbital motion. Oxidation process. Parachute. Planet, artificial. Propellant. Propulsion. Radiation. Radiation pressure. Reentry. *Rocket. Rocket astronomy. Rocket engine. Rocket* staging. Rocket-sled testing. Rudder, aircraft. Satellite, artificial. Similitude. Solar energy. Solar engine. Solar radiation. Space. Space biology. Space flight. Space station. Space technology. Space vehicle. Spacecraft structures. Specific fuel consumption. Specific impulse. Stabilizer. Stellar magnetic field. Supersonic flight. Tail assembly. Thermal stress. Thrust. Trajectory. Transonic flight. Turbine propulsion. Van Allen radiation. Weightlessness.

For articles on aeronautics *see* AERONAUTICAL ENGINEERING. For astronomical bodies *see* ASTRONOMY. *For articles on the upper atmosphere see* GEOPHYSICS; METEOROLOGY AND CLIMATOLOGY.

Strength of materials

See ENGINEERING MECHANICS.

Systematics

See ANIMAL SYSTEMATICS and various articles in INVERTEBRATE ZOOLOGY; PALEONTOLOGY, VERTEBRATE ZOOLOGY. *See also* PLANT TAXONOMY and various articles on plant groups in PALEOBOTANY.

Systems engineering

See CONTROL SYSTEMS ENGINEERING.

Taxonomy

See ANIMAL SYSTEMATICS; PLANT TAXONOMY; and various articles in INVERTEBRATE ZOOLOGY; PALEONTOLOGY; VERTEBRATE ZOOLOGY; the various plant groups in PALEOBOTANY.

Theoretical physics

Antimatter Antineutron. Antiproton Boltzmann constant. Boltzmann statistics. Boltzmann transport equation. Bose-Einstein statistics Brownian movement. Causality. Clock paradox. Compton effect. Conservation of mass. De Broglie wavelength Degeneracy (quantum states). Eigenfunction. Eigenvalue. Electrochemical process. Electrolyte. Energy. Energy level (quantum mechanics) Excited state. Exclusion principle. Fermi-Dirac statistics. Field theory, classical. FitzGerald-Lorentz contraction. Fourth dimension. Ground state Inertia of energy. Kinetic theory of matter. Mathematical physics. Matrix mechanics. Mean free path. Metastable state. Perturbation (mathematics). Perturbation (quantum theory). Photon. Planck's constant. Potentials (mathematics). Potentials (physics). Probability in physics. Quantization. Quantum (physics). Quantum electrodynamics. Quantum *field theory. Quantum* mechanics Quantum numbers. Quantum statistics. Quantum theory, nonrelativistic. Quantum theory, relativistic. Relativistic electrodynamics. Relativistic mechanics. Relativity. Rest mass. Ritz's combination principle. Schrödinger's wave equation. Space time. Spinor. Stationary state. Stationary wave. Statistical mechanics. Superposition, principle of. Symmetry laws (physics). *Theoretical* physics. Transformation theory, quantum. Uncertainty principle. Unified field theories. Wave mechanics. Wave packet.

Thermodynamics

Activity (thermodynamics). Adiabatic process Aerothermodynamics. Aircraft engine performance. Beattie-Bridgeman equation. Boltzmann constant. Boltzmann statistics Boyle's law. Brayton cycle. Carnot cycle. Charles' law. Chemical energy. Chemical engineering Combustion. Compressible flow. Conservation of energy. Crocco's equation. Dalton's law. Diesel cycle. Energy. Enthalpy. Entropy. Free *energy Gibbs function. Heat. Heat balance. Heat* exchanger. Heat pump. Internal energy. Isentropic process. Isobaric process. Isometric process. Isothermal process. Otto cycle. Polytropic process Potentials (physics). Propulsion. Rankine cycle. Refrigeration cycle Specific heat Statistical mechanics. Thermoanalysis. Thermochemistry. Thermodynamic cycle. Thermodynamic principles. Thermodynamics (chemical) Turbine propulsion. Van der Waals equation Vapor cycle Virial equation. Work.

See also PHYSICAL CHEMISTRY

Ultrasonics

See ACOUSTICS

Vertebrate zoology

Acipenseriformes Actinopterygii Aepyornithiformes Agnatha Albatross Alligator. Allotheria Amiiformes Amniota Amphibia. Amphicoela. An*amnia. Anguilliformes Anomocoela Anseriformes.* Anteater Antelope Apodiformes. Apterygiformes. Archaeornithes. Armadillo Artiodactyla Auk. Aves. Avocet. Baboon Badger Barracuda. Bass Bat. Batrachoidiformes Bear. Beaver. Beloniformes Beryciformes. Bird. Bison. Blackbird. Blacksnake. Bluebird Bluefish. Boa. Bobcat Bobolink Bullsnake Bunting. Bushmaster Caiman. Camel. Canary Caprimulgiformes. Capybara. Cardinal Caribou. Carnivora. Carp. Casuariiformes. Cat Catbird. Catfish. Cattle. Caudata. Cephalaspidomorphi Cetacea. Chamaeleon. Chamois Charadriiformes Chat. Chelonia. Chickadee Chicken. Chimpanzee. Chinchilla. Chipmunk. Chiroptera. Chuckwalla. Chondrichthyes. Chordata Ciconiiformes. Civet. Clupeiformes. Cobra Cockatoo. Codfish. Coelacanthiformes. Coliiformes Columbiformes Cony. Coot. Copperhead Coraciiformes Coral snake Cormorant. Cottonmouth Cougar. Cowbird. Coyote. Crane (zoology). Craniata. Crappie. Creeper. Croaker. Crocodile. Crocodilia. Crossbill. Crossopterygii. Crow. Cryptobranchoidea.